FOOD MANUFACTURE

Incorporating Food Industries Weekly

A PUBLICATION OF THE LEONARD HILL TECHNICAL GROUP MARCH 1, 1958

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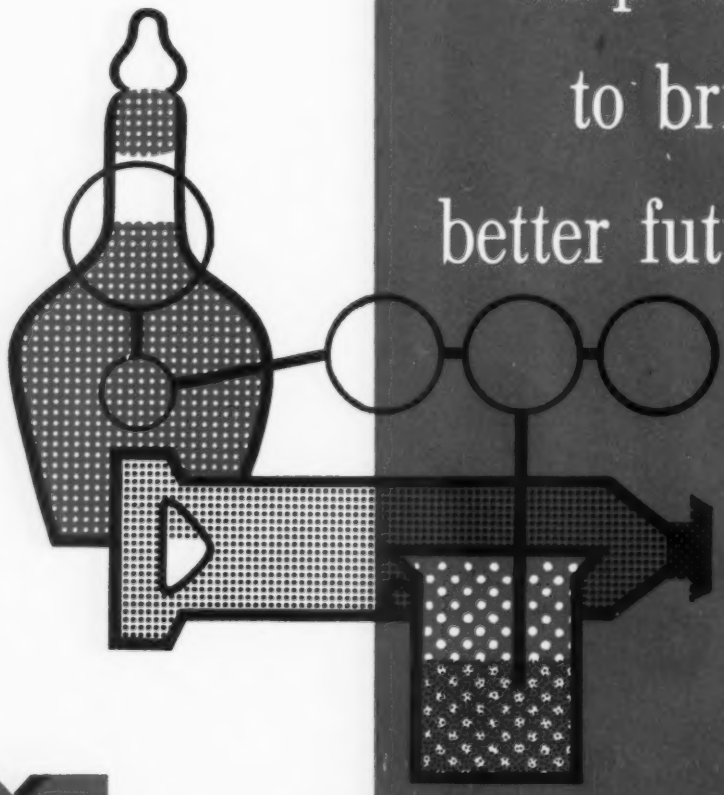

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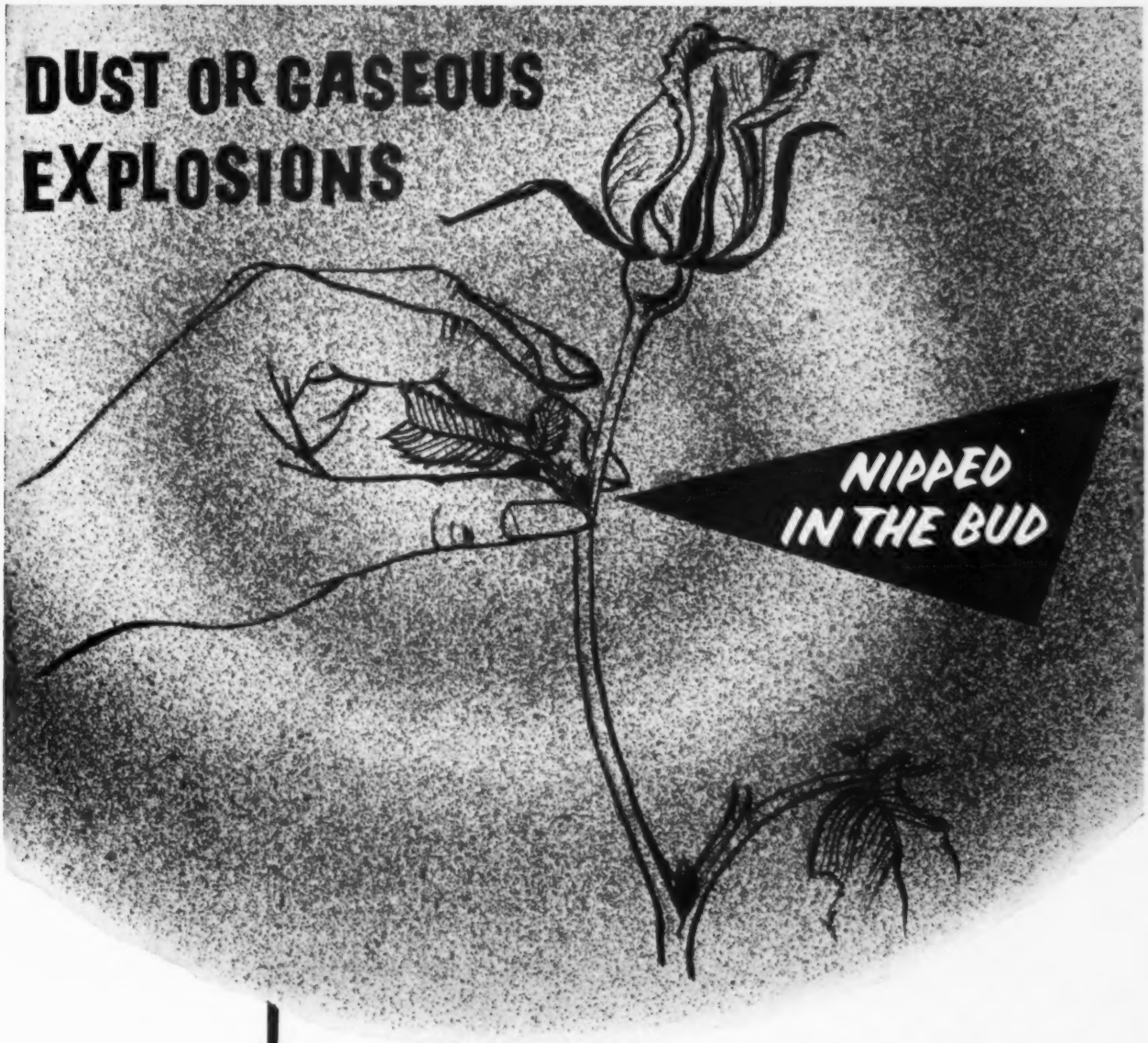

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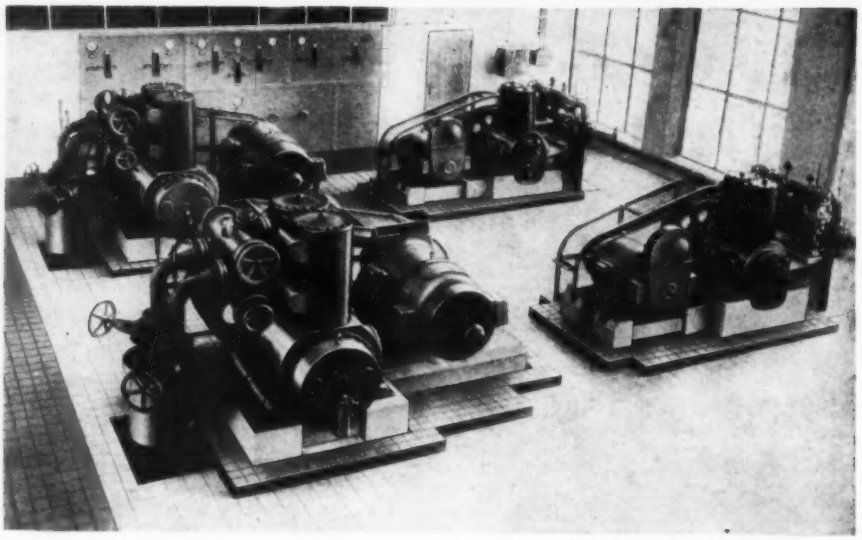

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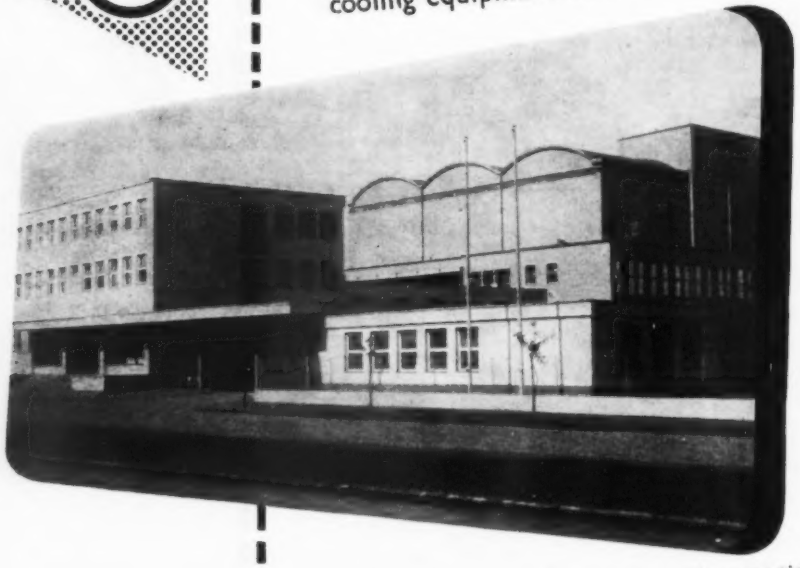

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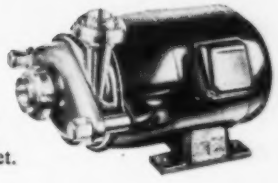

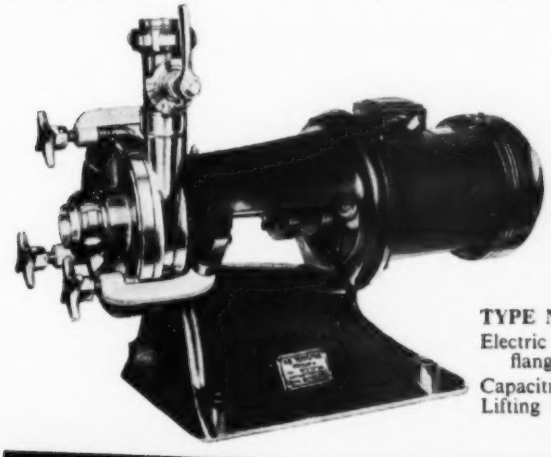

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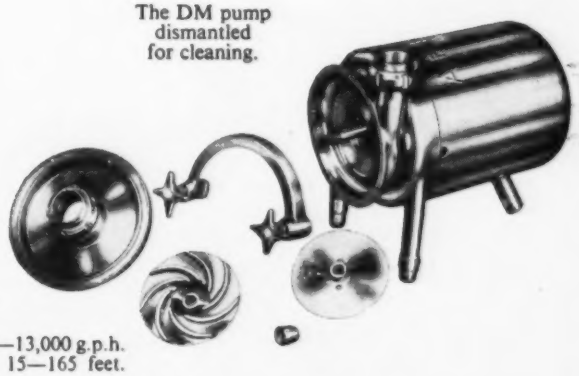

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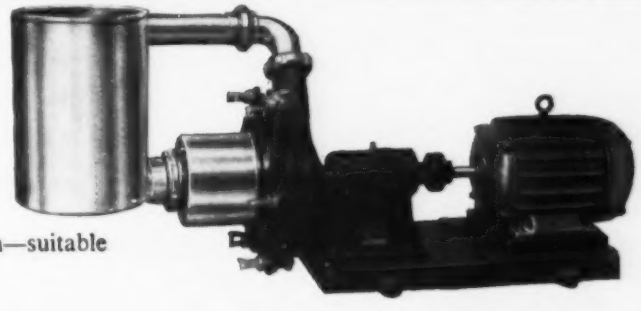

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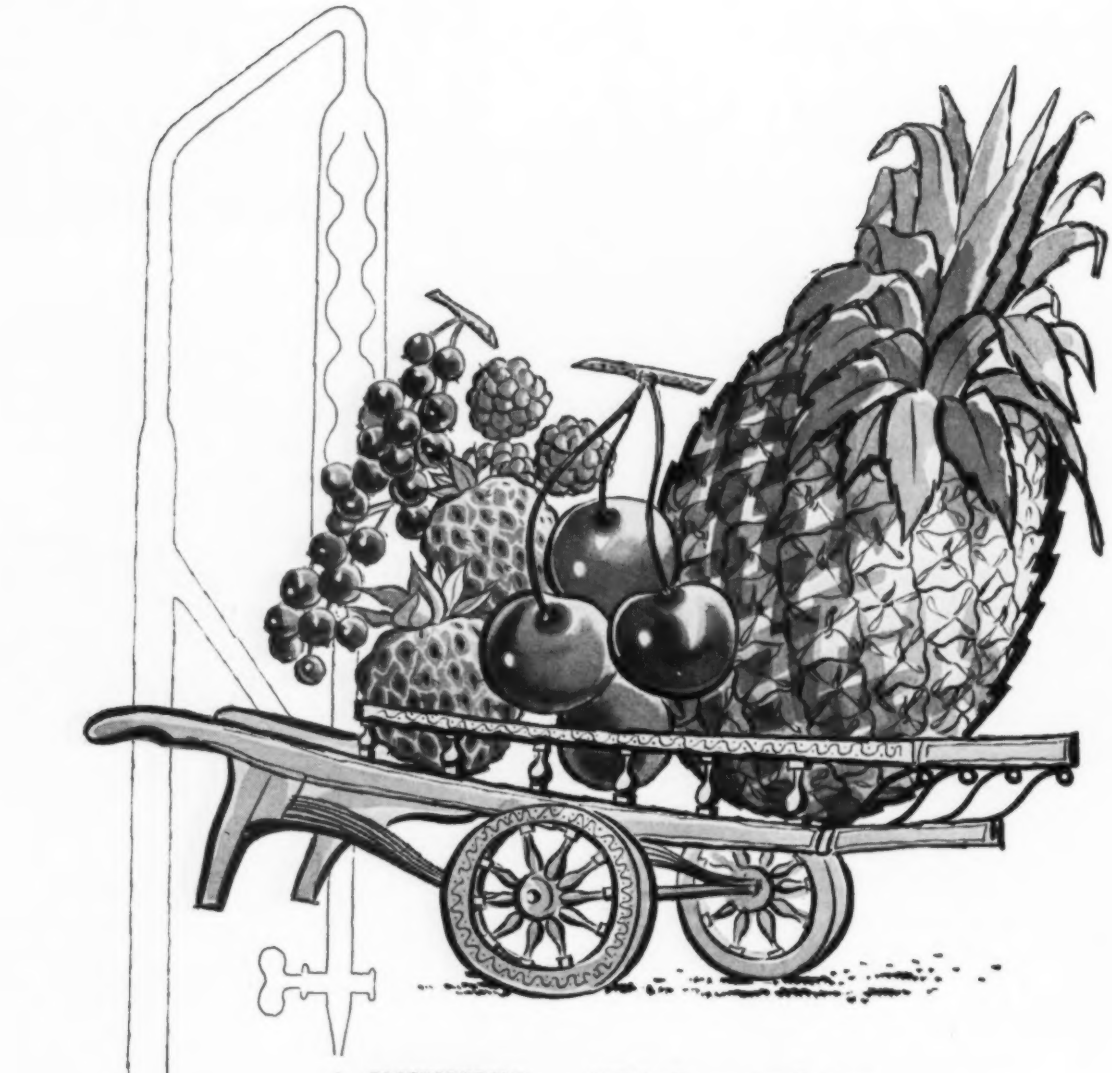

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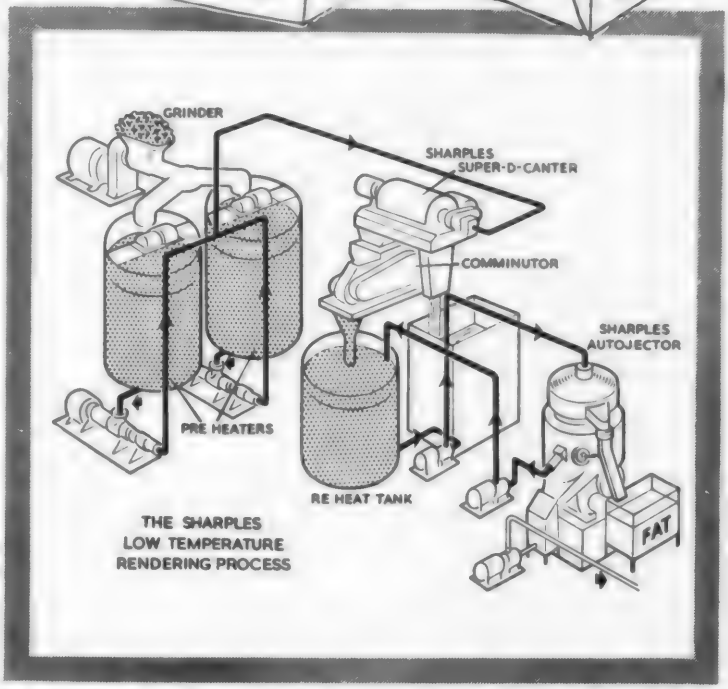

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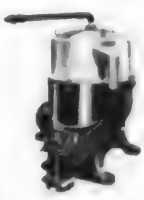
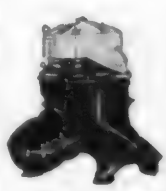

D-2 Centrifuge

D.H. Nozjector.


DV-2 Centrifuge

Super-D-Hydrator

Super-D-Canter

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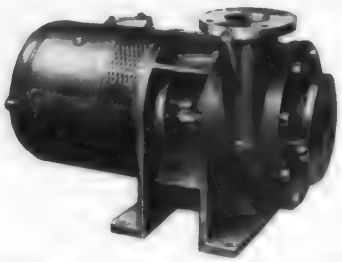

Unishaft Electric Pump. Robust construction. Vibrationless running. Compact overall and needs only a limited footing for installation. Sizes ¾ in. 1 in.–2 in./2½ in. Also available, to order, 3 in. 4 in. and 4 in. 5 in.

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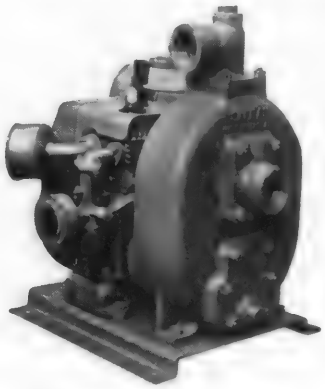
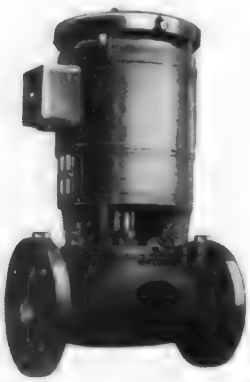
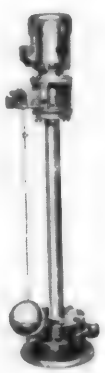


Automatic Self-priming unit. Pumps dirty water containing solids up to ¾ in. Size 1½ in. with 1·3 h.p. engine.



Hot Water Circulator Fullway-direct-in-pipeline type allowing gravity circulation when desired. Mechanical Seal. Sizes 1½ in., 2 in., and 3 in.



Sump Drainer for a variety of dewatering purposes. Float control switchgear incorporated. Size 1 in.

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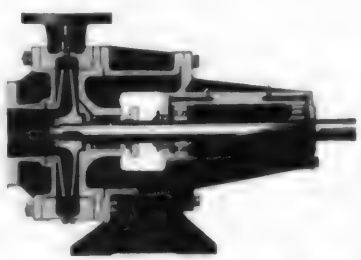

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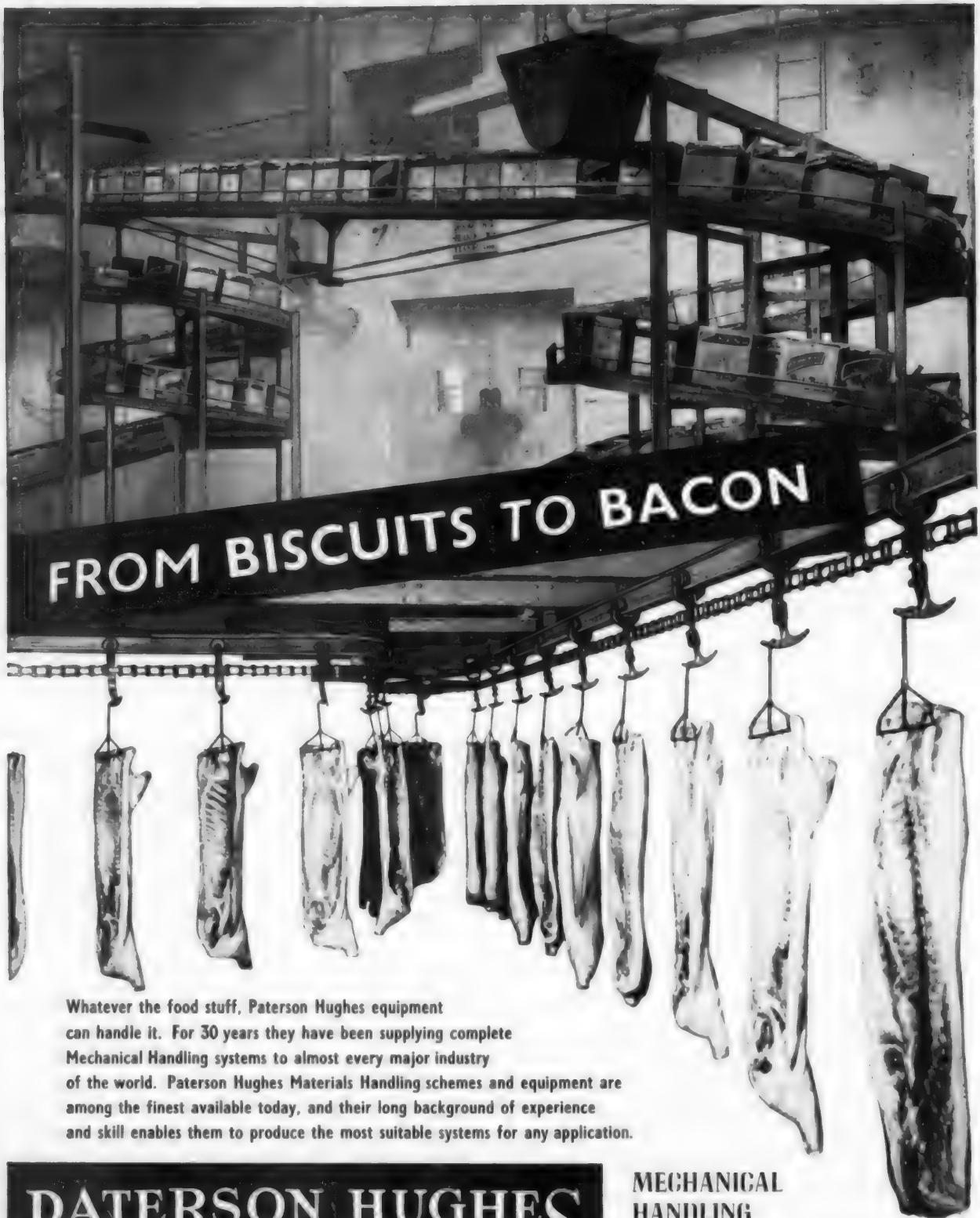

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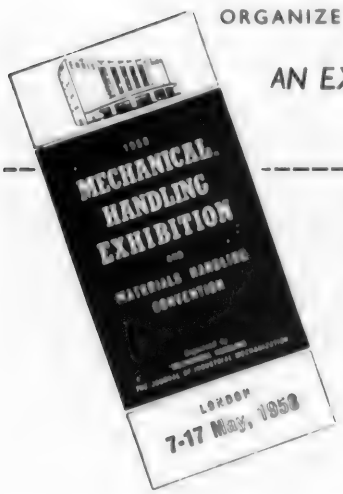

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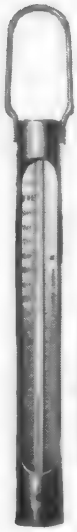
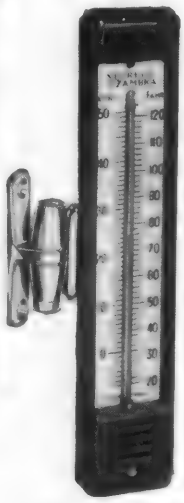


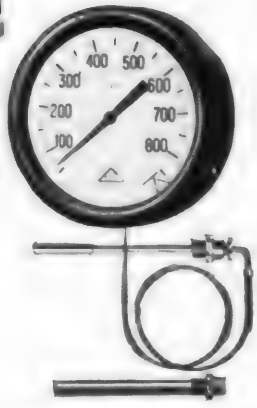
Thermometer for hot water, sugar boiling, etc.



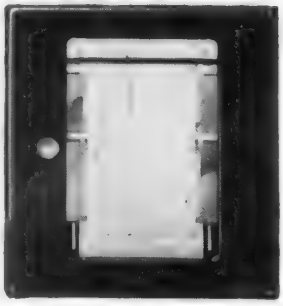
Room Thermometer with plastic case

Brass-cased Tank and Pipe Thermometer

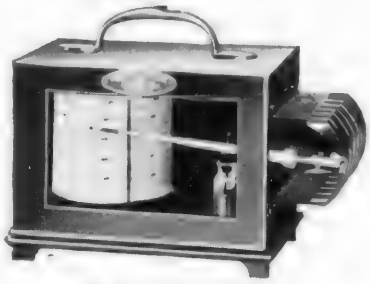
4" Mercury-in-steel Dial Thermometer, Rigid Stem Type



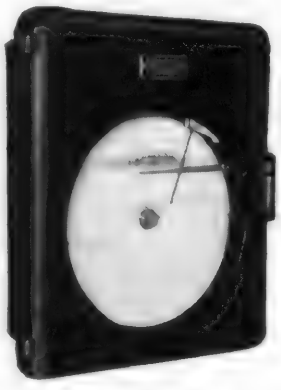
Distance-type Mercury-in-steel Dial Thermometer



Resistance Thermometer Recorder



Bi-metallic Recording Thermometer



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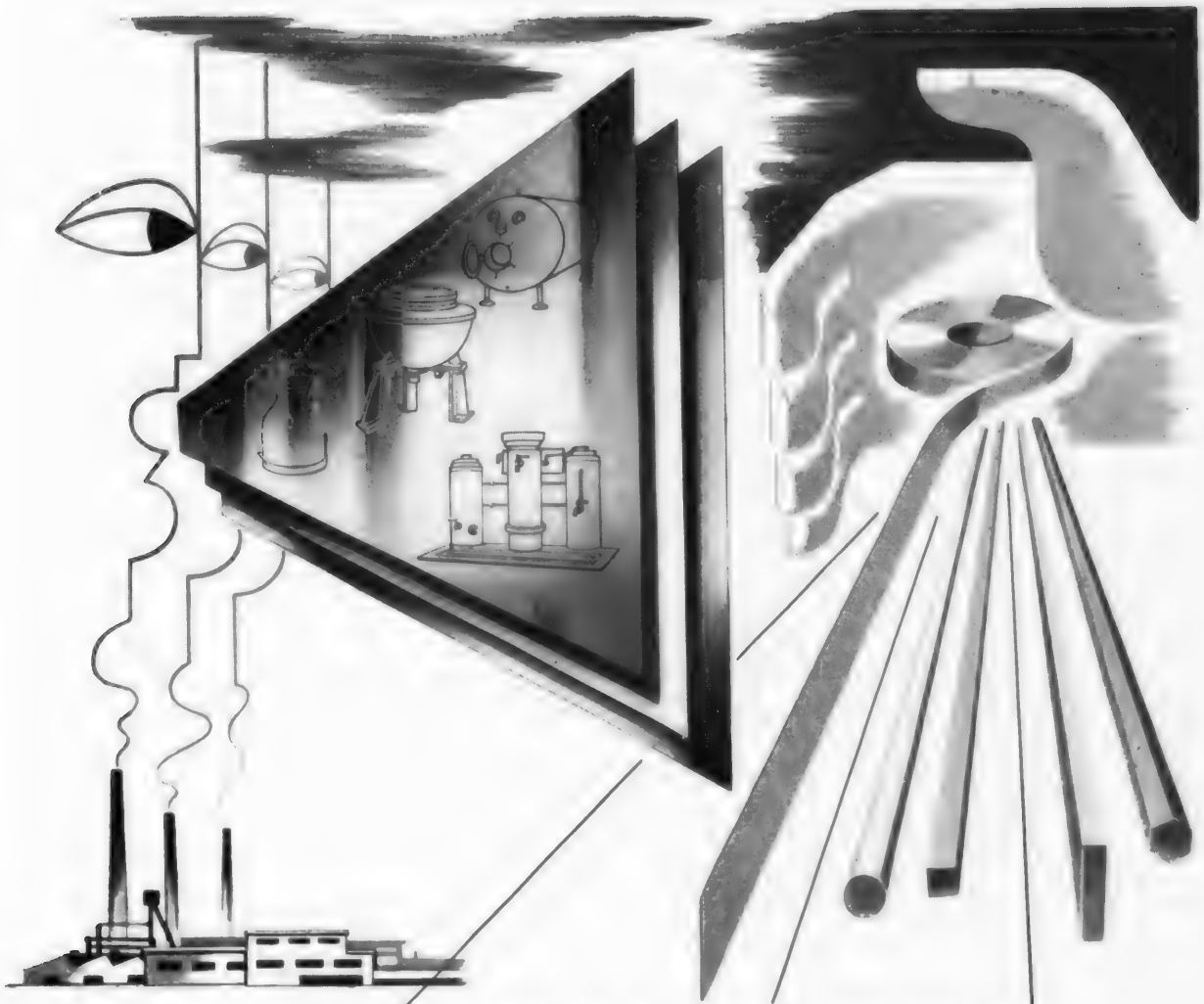

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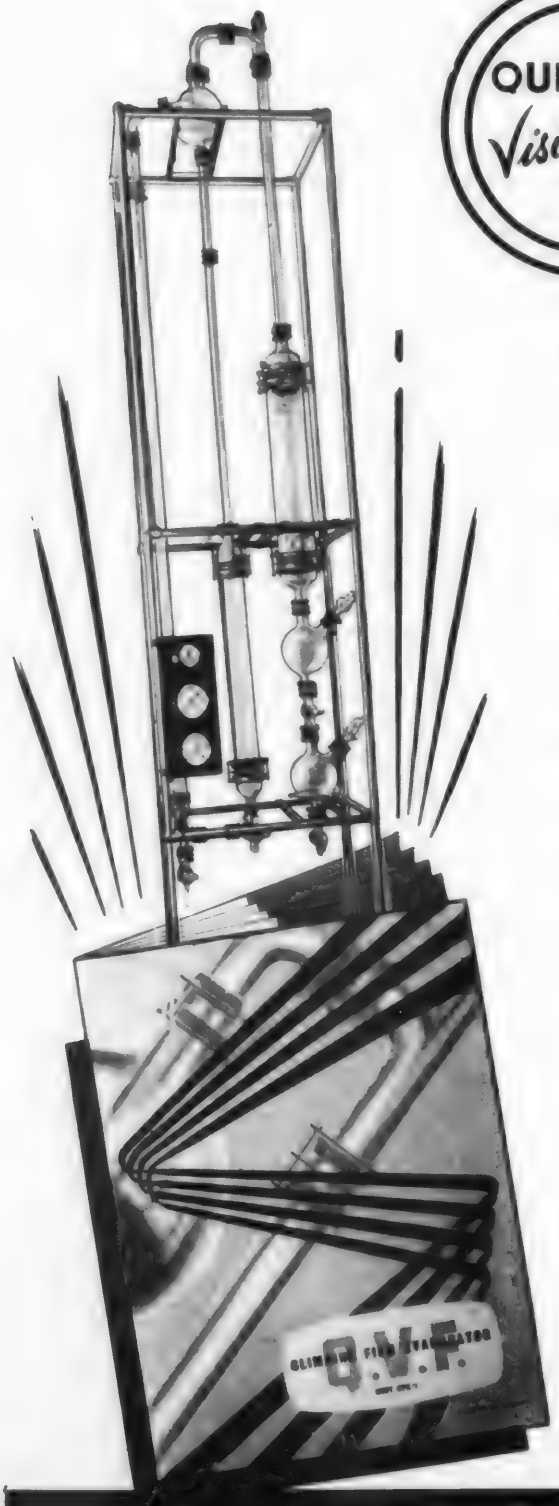

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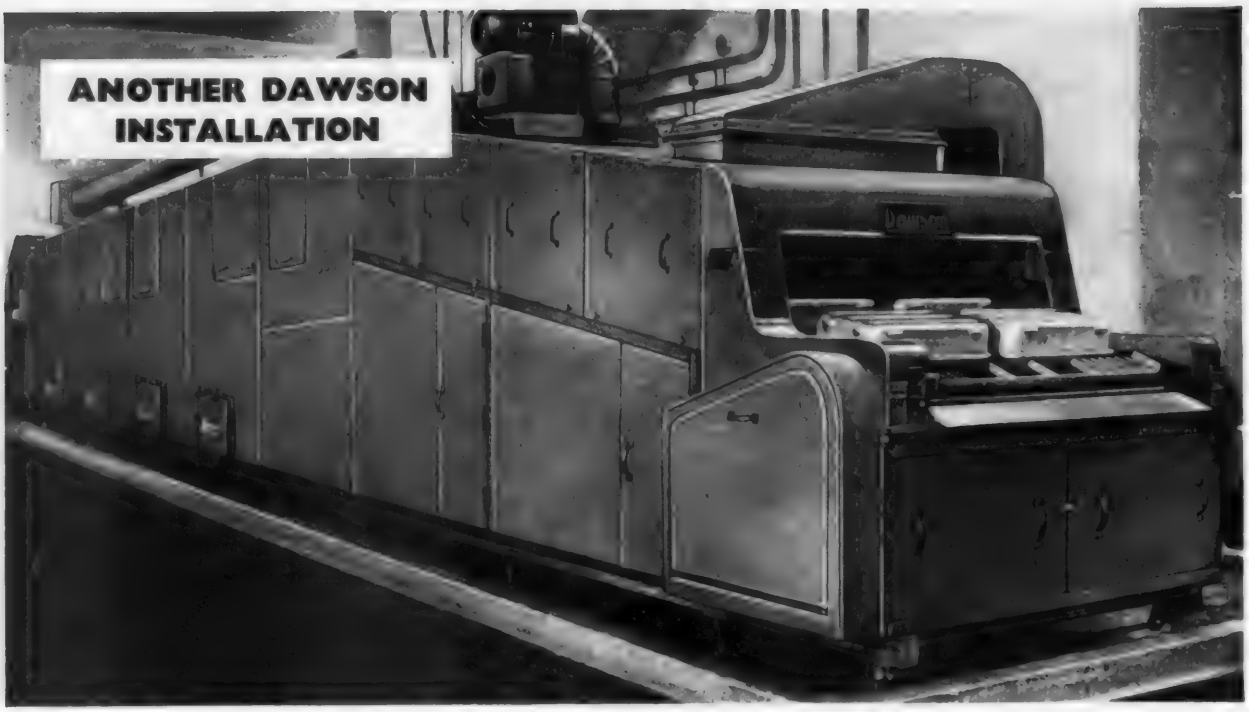

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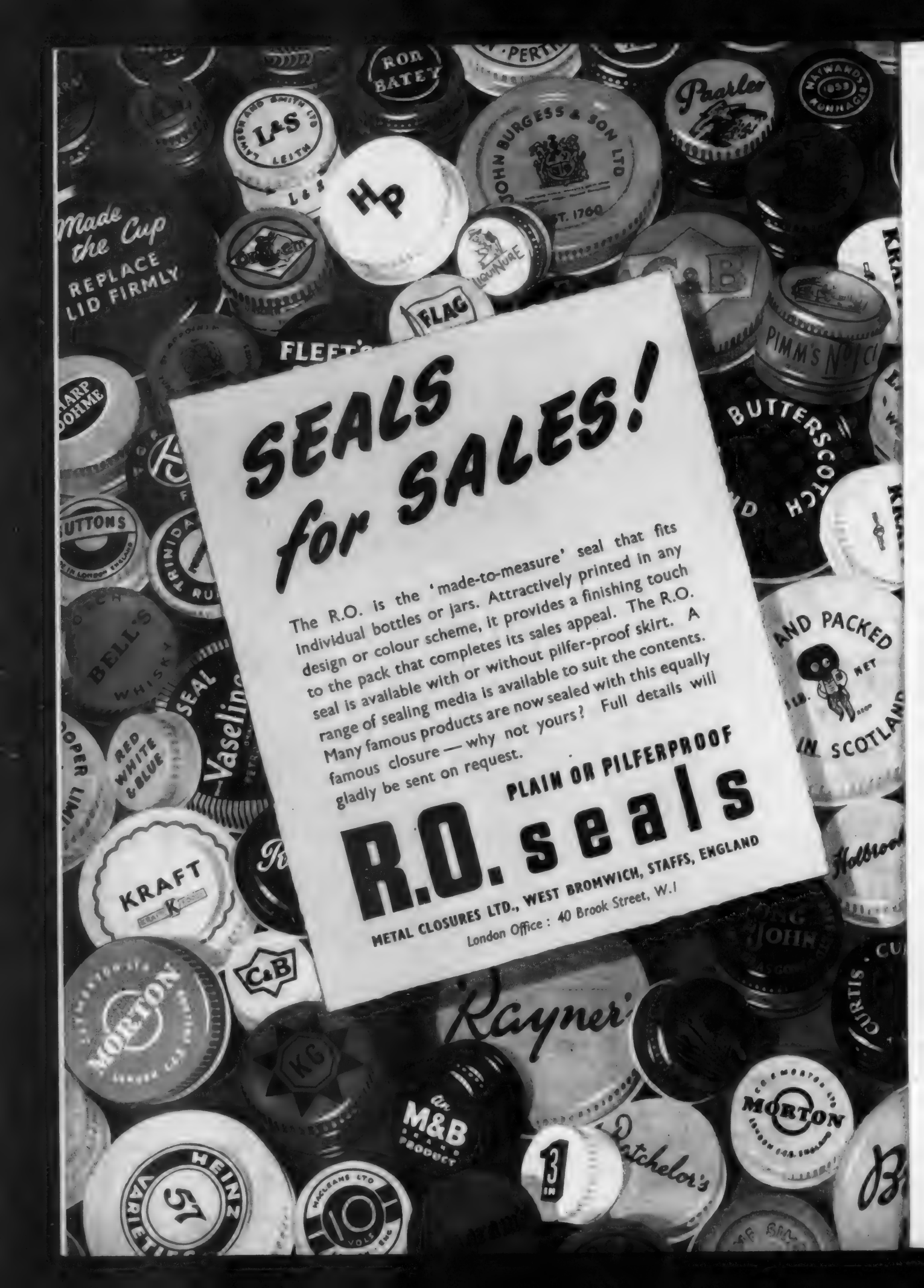
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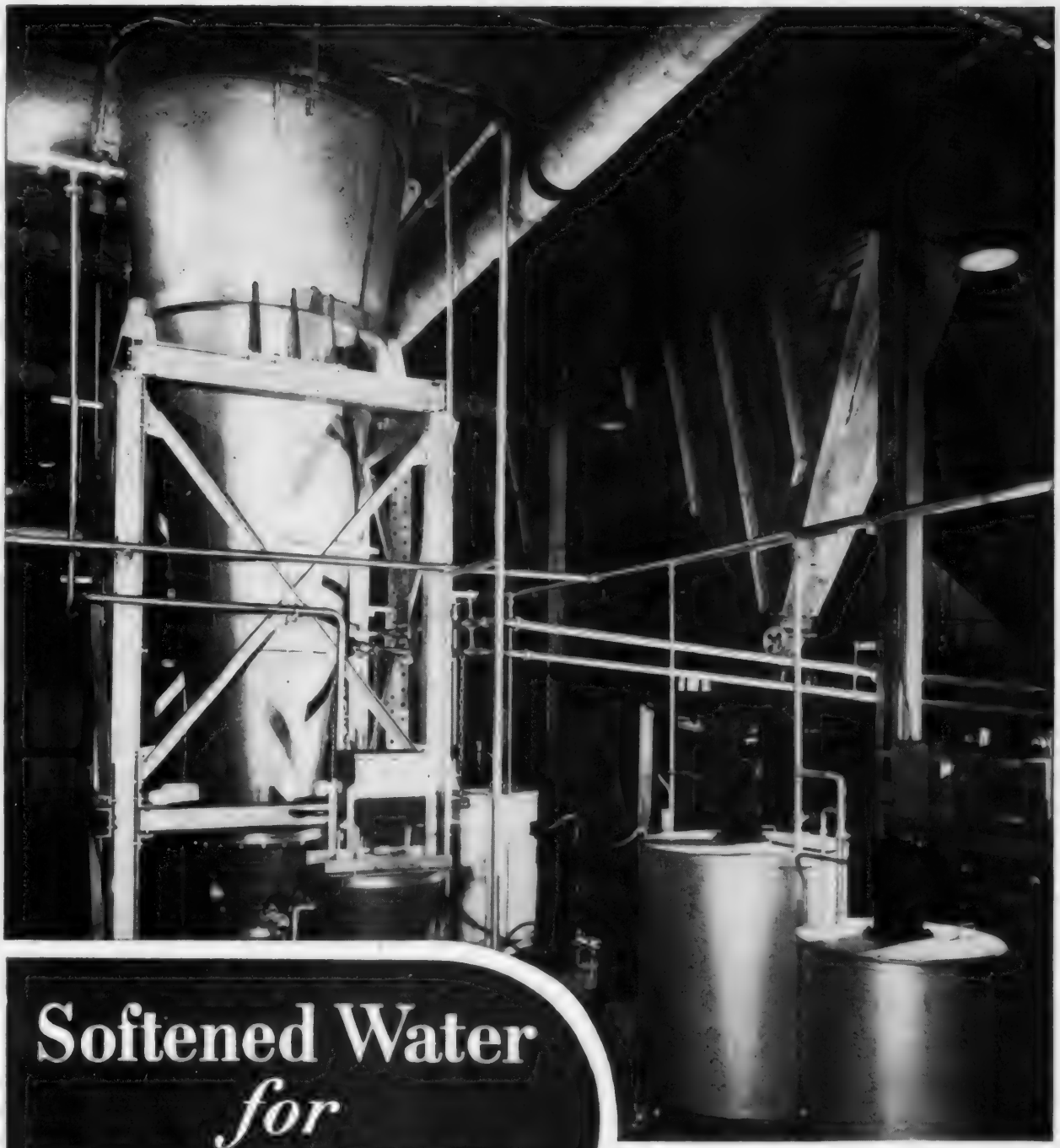

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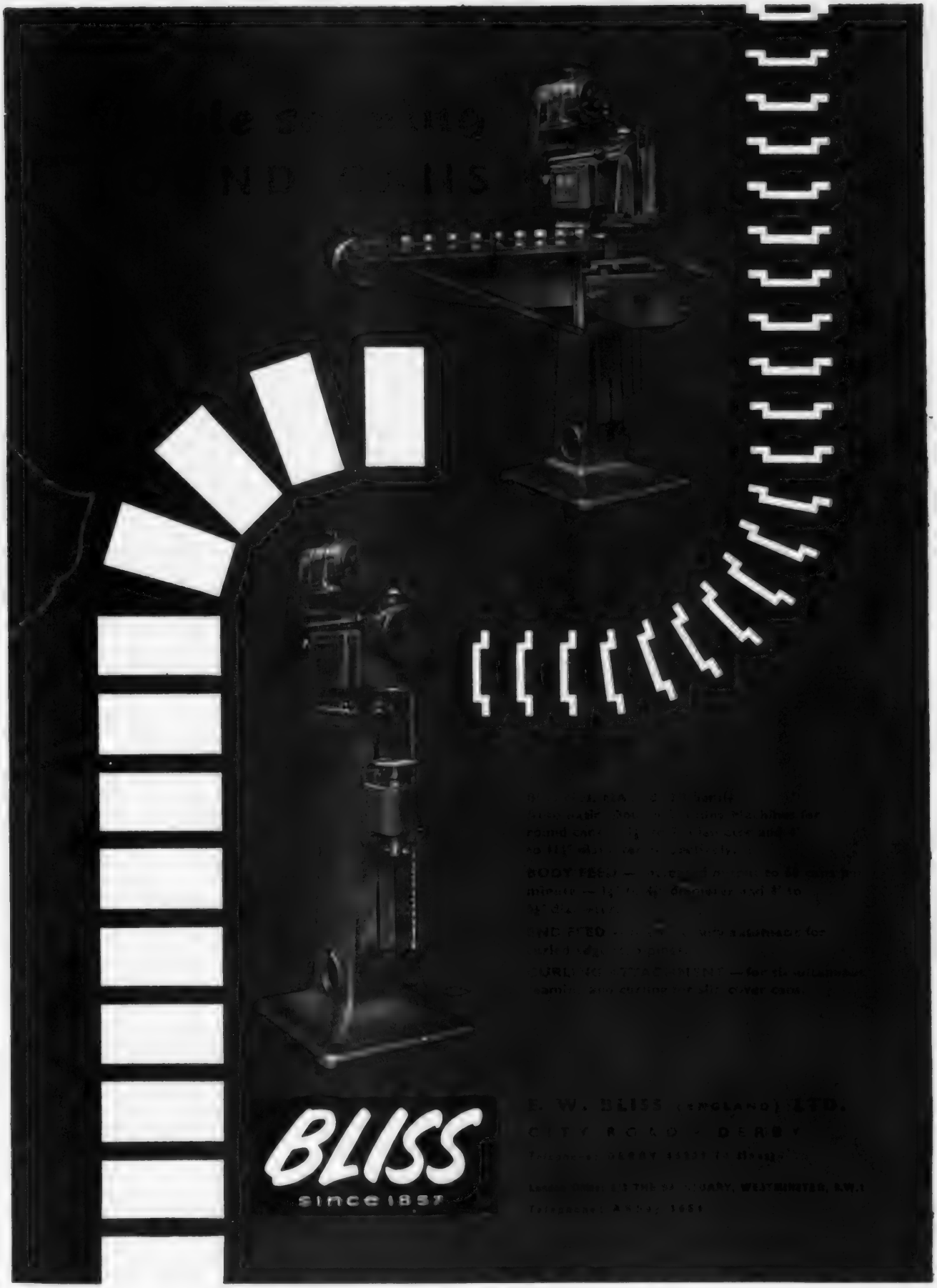
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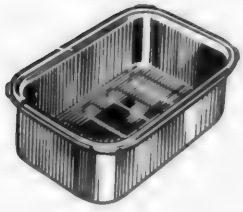
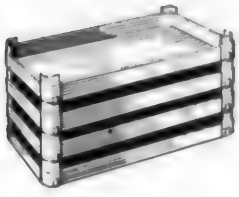




Range **C S. 24157 — 23½″ x 14¼″ x 7¾″**
C S. 24155 — 23½″ x 14¼″ x 5½″
C S. 24153 — 23½″ x 14¼″ x 3½″

Now produced from specially treated aluminium alloy to give increased strength to the base. Increased demand enables us to make this improvement without uplifting the selling price.

- ★ Absolutely hygienic and easy to clean
- ★ Exceptionally strong rim obviating handles
- ★ Positive stacking by extra deep swage
- ★ Available with or without base drainage holes
- ★ Larger sizes in 16 gauge, smaller size 18 gauge Aluminium Alloy
- ★ Lids also available, common to all sizes
- ★ All sizes will interstack

WARWICK 'WARCO' Reg Trade Mark ENGLAND
First Choice for Aluminium Equipment

Enquiries for all your Aluminium Equipment welcomed by

WARWICK PRODUCTION COMPANY LTD

A MEMBER OF THE ALMIN GROUP

BIRMINGHAM ROAD, WARWICK **Telephone: WARWICK 693-696**

Smart and functional!

COMMER

1½ TONNER

with long life petrol or diesel power unit

BUILT with your needs in mind, the Commer 1½ ton forward control model thrives on the toughest assignments . . . triumphs magnificently over the fierce strain of "stop-start" delivery work. A sterling example of Commer reliability, quality engineered, this lively model — available with chrome bore petrol or diesel engine to choice — gives the utmost economy of operation. Primarily fitted with van bodywork distinctively modern in style, the chassis also accommodates special bodies to suit individual requirements such as the above.

Built stronger to last longer!

A ROOTES PRODUCT

COMMER CARS LTD. LUTON EXPORT DIVISION: ROOTES LTD. DEVONSHIRE HOUSE PICCADILLY LONDON W.1

QUALITY in White Flint *GLASS CONTAINERS*

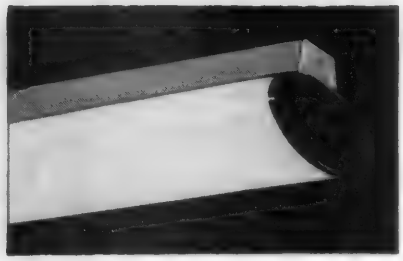
First Class in **GLASS**

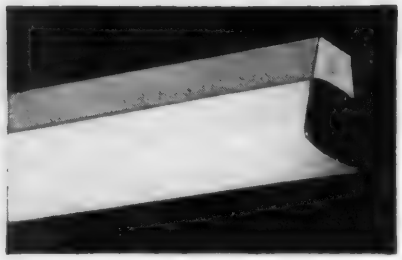
TRADE N MARK

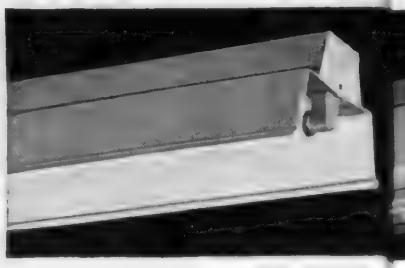
NATIONAL GLASS WORKS (YORK) LTD.

FISHERGATE, YORK. Tel. YORK 23021
ALSO AT: 105 HATTON GARDEN, LONDON, E.C.1.
Tel. HOLBORN 2146

Packed in easily handled cartons



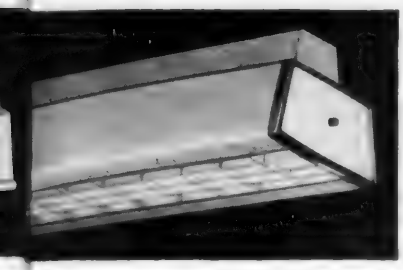


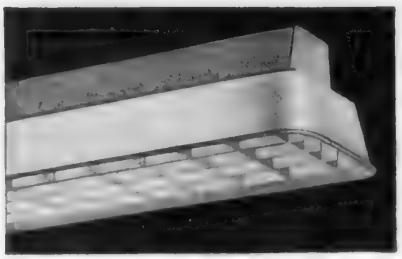


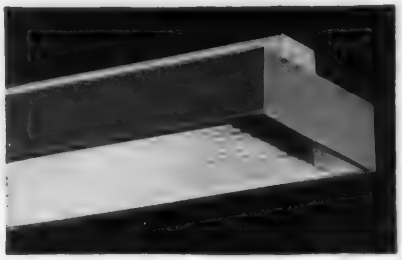
what's so new about
fluorescent fittings

THE GENERAL ELECTRIC CO. LTD.,

MAGNET HOUSE, KINGSWAY, LONDON, W.C.2.







these sanyway?

Everything is new! *The '101 Range' is an entirely new range of contemporary styled industrial, commercial and decorative fluorescent fittings. The successful result, in fact, of team work between G.E.C. fittings designers and illuminating engineers. Competitively priced—outstandingly modern in conception! NEW also is the introduction of basic channels for single or twin tubes, 1½ ft. to 8 ft. which, with specially designed attachments, form an interchangeable system of great versatility with particularly simple installation and maintenance. It is important that you learn all about this exceptional range —the '101 Range'—of G.E.C. fluorescent fittings, so write for fully descriptive catalogue No. F 4068.*

new adaptability

The G.E.C. '101 Range' sets a *new standard* of adaptability. Using as a basis, channels of common cross section, industrial, commercial and decorative fittings are built without a multitude of small parts. Each is a soundly engineered fitting, of modern appearance and incorporates many aesthetic and mechanical refinements. Installation and maintenance are absolutely simple.

new reflectors

For the first time the industrial user can have vitreous enamelled closed end trough reflectors made from a single pressing, with well-rounded corners and without joints. They are therefore particularly easy to clean. New techniques enable them to be made lighter than previous types and therefore easier to handle and less susceptible to damage.

new 8 ft. tubes

Recessed double contact (R.D.C.) caps are fitted to OSRAM 8 ft. 125 w. tubes for use in the '101 Range'. This new cap design protects the tube ends and allows replacement by one person from one ladder position. Recessed double contact caps also provide firm, reliable support and location for these tubes without relying on contact pins or independent clips. This results in easier tube replacement after cleaning or maintenance. Unsightly shadows are reduced, as the new cap gives a smaller "dead region" at tube ends. Osram Guaranteed Tubes, with their freedom from early failures, are recommended for all G.E.C. lighting fittings.

G.E.C. range

fluorescent fittings

THE REALITY OF A COMPLETE LIGHTING SERVICE

A MEMBER OF THE LARGEST DAIRY

WILTS UNITED DAIRIES

No. 3 MELKSHAM

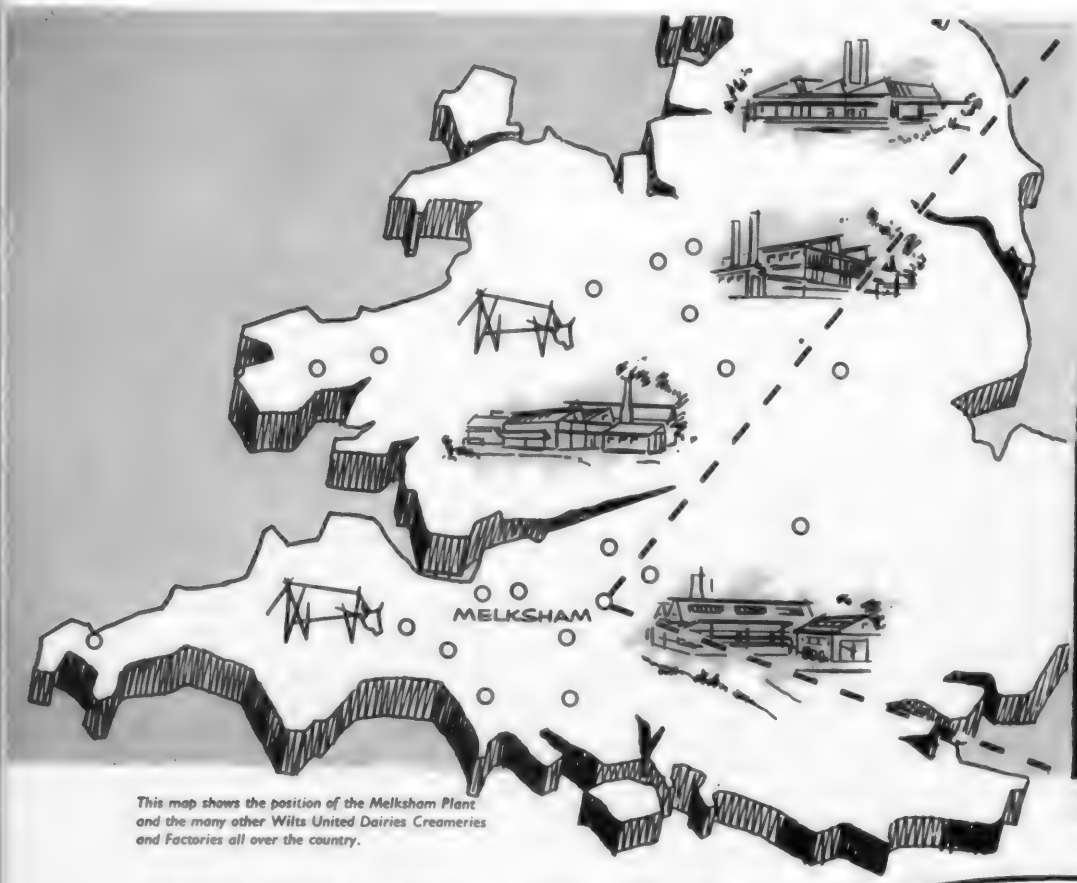
The site of the first manufacturing plant to be operated by Wilts United Dairies, Melksham in Wiltshire can truly be called the home of the United Dairies Group.

Collecting up to 42,000 gallons of milk in a day from farms in the fertile valley of Pewsey and other parts of the lush Wiltshire countryside, the Creamery at Melksham specialises in Sweetened Condensed Milk. Here, after scrupulous quality control tests, Full Cream and Skimmed Sweetened Condensed Milk is pumped into giant road tankers and other containers for immediate despatch to our customers throughout the country.

Loads of fresh cream from the separated milk also leave Melksham daily; and in addition, many thousands of cases of Condensed Milk are packed under the company's well-known brand names for distribution at home and abroad.

WILTS *have an unequalled knowledge of milk products in this country; any information you may need on this subject is freely and gladly offered as part of their service.*

MILK PROCESSING THE MODERN WAY



This map shows the position of the Melksham Plant and the many other Wilts United Dairies Creameries and Factories all over the country.

An exterior view of the busy Melksham Creamery in Wiltshire.

FOR QUALITY AND SERVICE

WILTS
UNITED DAIRIES

For all forms of milk

PRODUCED AT MELKSHAM:

Fresh Cream · Full Cream and Machine Skimmed Sweetened Condensed Milk

PRODUCED AT OTHER WILTS FACTORIES:

Roller Dried Full Cream and Skimmed Milk Powder (also with added Vitamin D for baby feeding) · Spray Full Cream Milk Powder · 'Kreemix' Complete Ice Cream Powder · Spray Skim Powder · Full Cream Evaporated Milk

And, of course, Butter, Cheese and all other Dairy Products

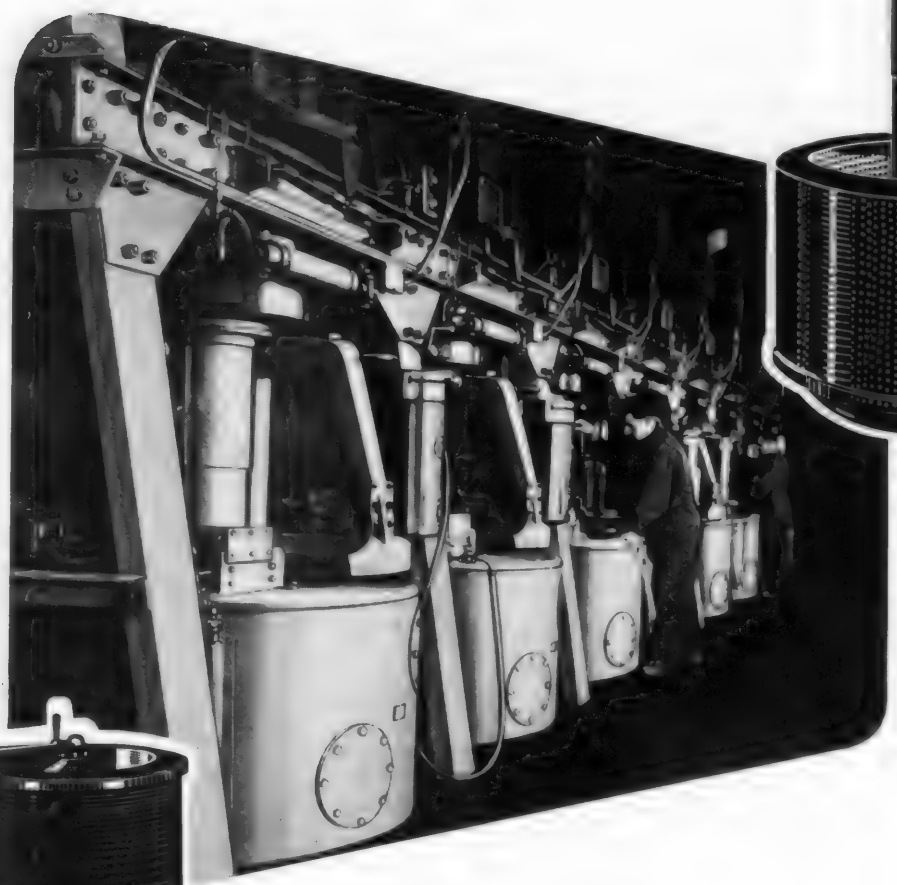
WILTS

WILTS UNITED DAIRIES LIMITED
TROWBRIDGE · WILTSHIRE
Telephone: Trowbridge 3611

A view of one of the evaporators incorporated in the refrigeration plant at the Wilts United Dairies Creamery, Melksham.

an extensive range–

of **HIGH-SPEED CENTRIFUGALS** for rapid, hygienic food processing made of suitable corrosion resisting materials



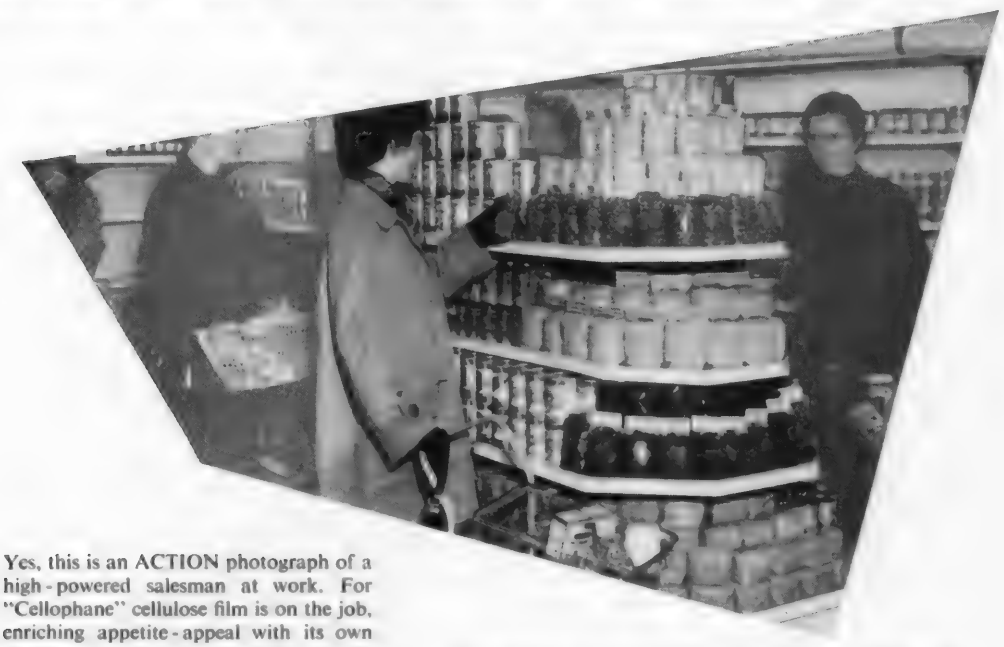
Broadbent high duty sugar centrifugals in a modern sugar factory

Over 90 years experience in the specialised field of centrifuging enables us to recommend the most satisfactory equipment for increasing your production

THOMAS BROADBENT & SONS LTD., HUDDERSFIELD.

Phone: 5520/5 Grams: BROADBENT, Huddersfield

WHERE'S THE SALESMAN IN THIS PICTURE?



Yes, this is an ACTION photograph of a high-powered salesman at work. For "Cellophane" cellulose film is on the job, enriching appetite-appeal with its own sparkle, winning customer-approval, making those important "impulse" sales.

The housewife likes the *visible* assurance of freshness and hygiene that "Cellophane" brings, and appreciates the convenience of easy-to-carry-away packs. Above all, she recognises that a transparent "Cellophane" film package is a guarantee of the manufacturer's absolute confidence in his product (he has nothing to hide), and therefore a guarantee of quality.

There's nothing like "Cellophane" film to keep food fresh and to protect it from dirt, dust and grease.

For extra packaging convenience use "Cellophane" film bags. And for putting over your name and sales-message, there's nothing to equal colour-printed "Cellophane" film. We can put you in touch with the best film-printers and bag-makers—such as our associated company, Colodense Limited of Bristol.

In particular, the new MXXT "Cellophane"—the most moistureproof film in the world—will guard the freshness of the most "difficult" products for long periods. The exceptional sparkle and freedom from wrinkling of MXXT film gives packs special eye-appeal.

Write to us today, and find out how "Cellophane" can improve your business.

BRITISH CELLOPHANE LIMITED

Commercial Offices: 12-13 CONDUIT STREET, LONDON, W.1

Reg. Offices & Factory: BATH ROAD, BRIDGWATER, SOMERSET

"Cellophane" is the registered trade mark of British Cellophane Limited and denotes the brand of cellulose film manufactured by them.

The Pioneers of Balanced Detergents and *Quaternaries for the Food Industries.*

Cleaners and Sterilisers for Bottles and Plant

Bottles

B.H.C. 350's

The problem of combining bactericidal powers with effective wetting and cleansing to obtain the perfectly washed bottle has occupied the minds of scientists and manufacturers for many years. When B.H.C. developed their 350 series, this problem was overcome. Containing as it does, a non-foaming Quaternary Ammonium Compound it possesses an exceptional bacteria-killing power even at low temperatures, with the most thorough wetting power and unprecedented detergency.

Plant

DECIQUAM

The degree of cleanliness and sterility of your plant is reflected in the sterility of the final processed product. Deciquam, and its derivatives, highly soluble twin-chain quaternary ammonium compounds, have high wetting and penetration powers, and are highly active against a wide range of micro-organisms including yeasts and moulds. Their bacteria killing power is unequalled and as they are highly resistant to inactivation by anionic and organic materials, they provide a sterilising solution which has a long life with resultant economy.

Just ring LIBerty 1021 (5 lines) for a representative to call
or post this coupon and find out what B.H.C. Service really means!

THE BRITISH HYDROLOGICAL CORPORATION
COLLOIDAL WORKS · HIGH PATH · MERTON · LONDON · S.W.19

Associated Companies: Colloidal Detergents of Australia Ltd., Australia. Chemical Services (Pty.) Ltd., S. Africa. And at Amsterdam, Brussels, Copenhagen, Dublin, Helsinki, Johannesburg, Kolbotn Norway, Lille, Lyon, Ober-Winterthur Switzerland, Paris, Sydney.

Please send me full details of B.H.C. 350's and Deciquam.

Name _____

Address _____

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For sure protection of canned foodstuffs

IT'S THE Lacquer THAT COUNTS

Yet another addition to the Coates range of Preservex lacquers. The Lacquer to guard against blown cans, can corrosion, and sulphur staining—in fact, to be recommended for all types of canning.

Coates

PRESERVEX
UNIVERSAL LACQUER

COATES BROTHERS INKS LIMITED

EASTON STREET ROSEBERY AVENUE, LONDON, W.C.1.

SERVE THE PRINTING WORLD

Now Metal Box offer

the carton with diaphragms!

The Expresso carton is easy to open fully, but if you want to pour out a portion and leave the rest in the carton you have only to slit the diaphragm at one corner. The pack can then be reclosed giving considerable protection to the product, and remaining spill proof.

Air-tight · Powder-tight

The new Expresso carton is so efficiently sealed that it becomes *air-tight* and *powder-tight*. Neither inner bag nor overwrap are needed. The carton is fed flat into the Expresso machine, automatically erected, and fitted with a bottom diaphragm which is heat sealed. Still automatically, the carton is filled, a top diaphragm is fitted and heat sealed, and the flaps are closed.

Metal Box make the cartons of plain board or hi-gloss waxed board, and line them with Diothene, Pliofilm, foil, or vegetable parchment, with appropriate diaphragms. The seal is really excellent. Ask for a sample and test it!

High quality colour printing is of course available.

The Expresso system lets you now pack in cartons a wide range of powder and/or hygroscopic products such as ground coffee, dehydrated milk, oatmeal, salt, or cake mix. The smooth walls of the carton help frozen foods to freeze quickly and slide out easily.

The Expresso machine is of simple design, is easy to install, operate, and move about, and needs little looking after. Sole agents for the machine in the U.K. and Eire are Baker Perkins Ltd.

Metal Box will gladly advise you on every aspect of this latest form of carton. Ask today for that sample.

THE METAL BOX COMPANY LIMITED
Paper Products Group
37 BAKER STREET · LONDON W.1 · Hunter 5577

NAUTA MIXING IN 3-D

The screw rotates both round its own axis and round the conical vessel. Material is thus subject to an intense, cross-current action which gives rapid, efficient mixing.

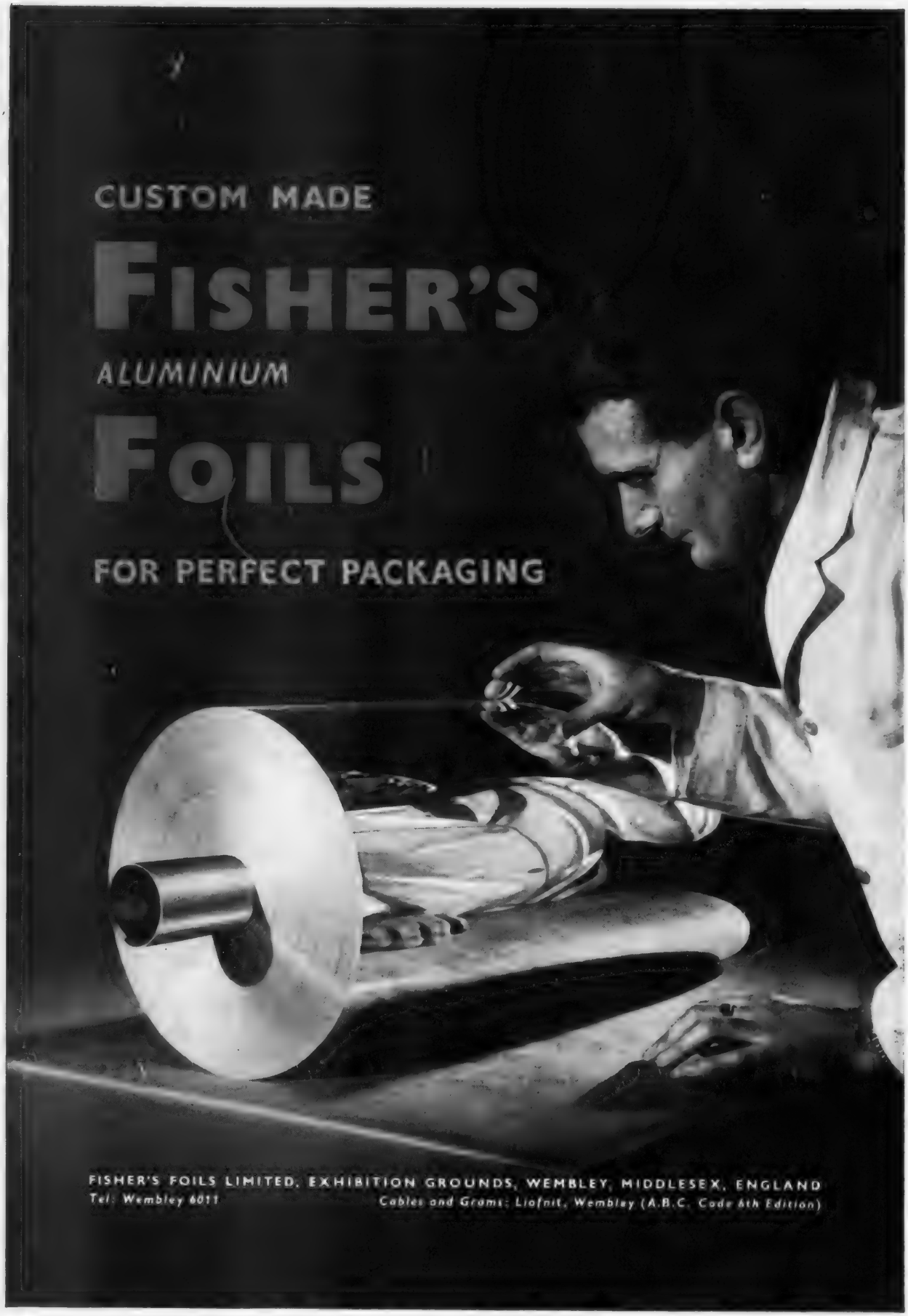
TAS/FS. 518

THE NAUTA MIXER WILL BE DISPLAYED BY W. J. FRASER (STAND No. 2) AT THE CHEMICAL AND PETROLEUM ENGINEERING EXHIBITION, JUNE 18-27

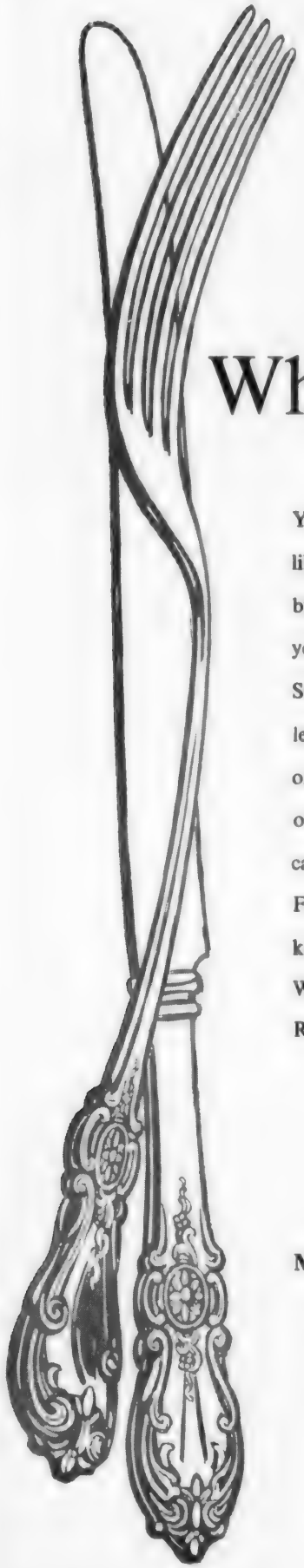
For the food, animal feedstuffs and other industries where efficient, rapid solid/solid or liquid/solid mixing is required; particularly where the problem is one of adding a small additive to a large bulk of product. A leaflet describing 4 different models—Overdrive, Underdrive, Junior and Lilliput—is now available. Write to the sole licencees and manufacturers for U.K. and British Commonwealth Countries:—

W. J. FRASER & CO. LTD., HAROLD HILL, ESSEX.
BARNSLEY, YORKS.

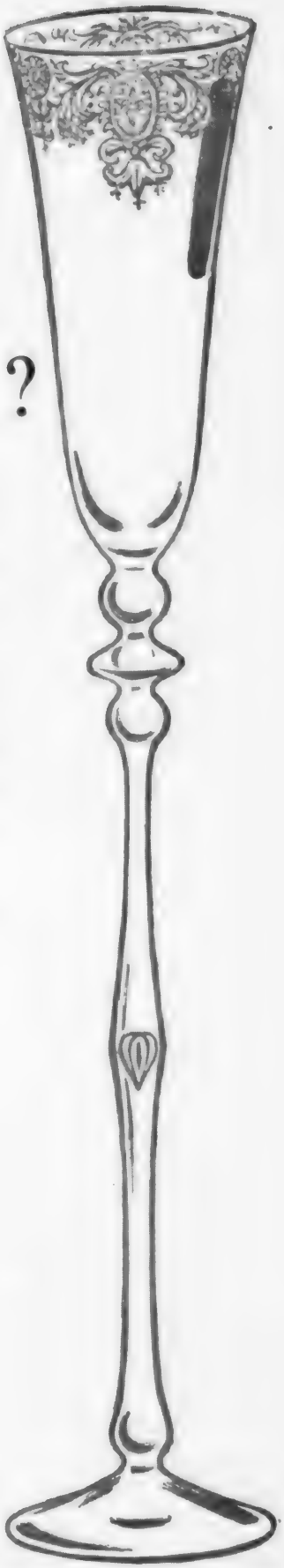
W. J. FRASER & CO. LTD.


CUSTOM MADE
FISHER'S
ALUMINIUM
FOILS
FOR PERFECT PACKAGING
FISHER'S FOILS LIMITED, EXHIBITION GROUNDS, WEMBLEY, MIDDLESEX, ENGLAND
Tel: Wembley 6011
Cables and Grams: Liofnit, Wembley (A.B.C. Code 6th Edition)

M-W.106



Who is a gourmet?



Your customers are. They enjoy good flavours. They like the taste of your products, that is why they keep on buying them. It is most important to them and you that your flavours remain the same.

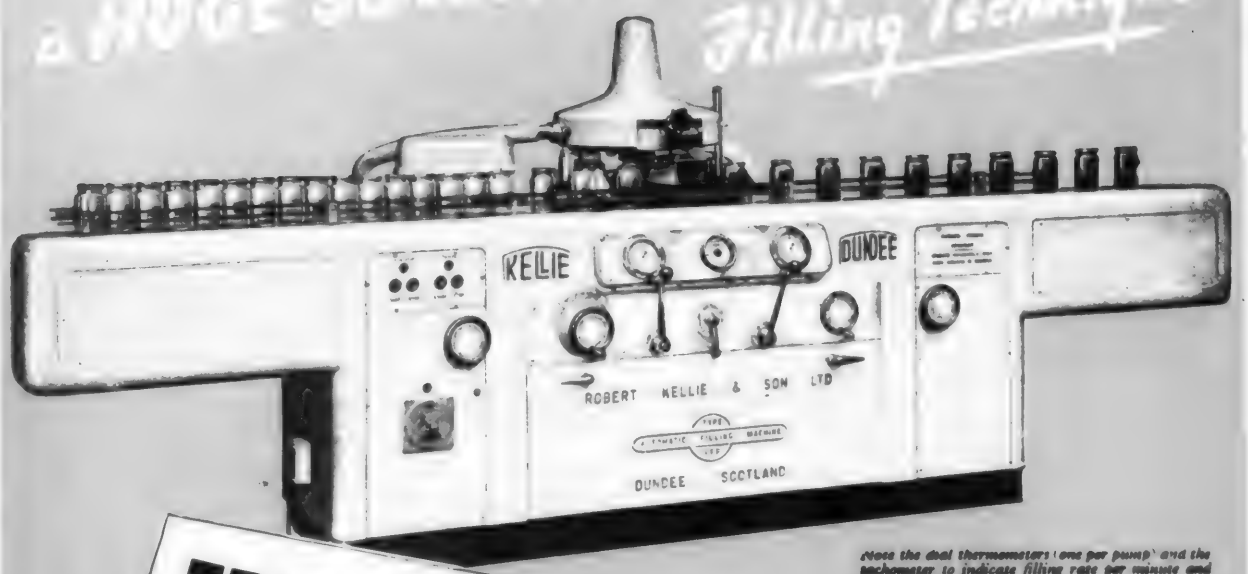
StaffordAllens are making flavours today on which leading manufacturers have built up world-wide sales of now famous products over a period, in some cases, of twenty or thirty years. For consistent flavours you can rely on StaffordAllens.

For new flavours, too, StaffordAllens have a happy knack of hitting that popular, mass-market appeal. Why not consult Stafford Allen & Sons Ltd., Wharf Road, London, N.1, Telephone: CLErkenwell 1000?

StaffordAllenS

MAKE SPECIALLY GOOD FLAVOURS

A HUGE stride forward in Container Filling Technique



Note the dial thermometers (one per pump) and the tachometer to indicate filling rate per minute and record total fillings during run.

KELLIE'S NEW AUTOMATIC STRAIGHT-LINE FILLING MACHINE

for liquids, semi-liquid and viscous products including jams, jellies, marmalades, soups, syrups, lemon curd, creams, etc.

A FEW OUTSTANDING ADVANTAGES

Infinitely variable filling rates
(according to product and type of container
30 to 240 1 lb. containers per minute
60 to 240 ½ lb. containers per minute
30 to 120 2 lb. containers per minute
30 to 80 3 lb. containers per minute

Infinitely variable conveyor speed

Automatic continuous container feed and delivery from 30 to 240 per minute on stainless-steel-slat conveyor.

Comprehensive safety standards

Pumps and conveyor electrically interlocked (both starting and stopping). Foolproof mechanical interlocking between pumps. Full enclosure of driving mechanism and electrical controls. Smooth contouring for hygiene preservation.

Micro-regulation whilst filling

Smooth and accurate filling, non-spilling, non-aerating, micro-regulated whilst machine is running.

Infinitely variable pump delivery

136 to 541 gallons per hour from *each* of two pumps—operable separately, simultaneously or consecutively.

Perfect protection of products

Whole-fruit strawberries and cherries, for example, are not even bruised.

Write at once for the complete specification and learn just how much you will gain in speed, efficiency, accuracy, economy and convenience. Specify KELLIE TYPE 11FP (Patents pending).

KELLIE

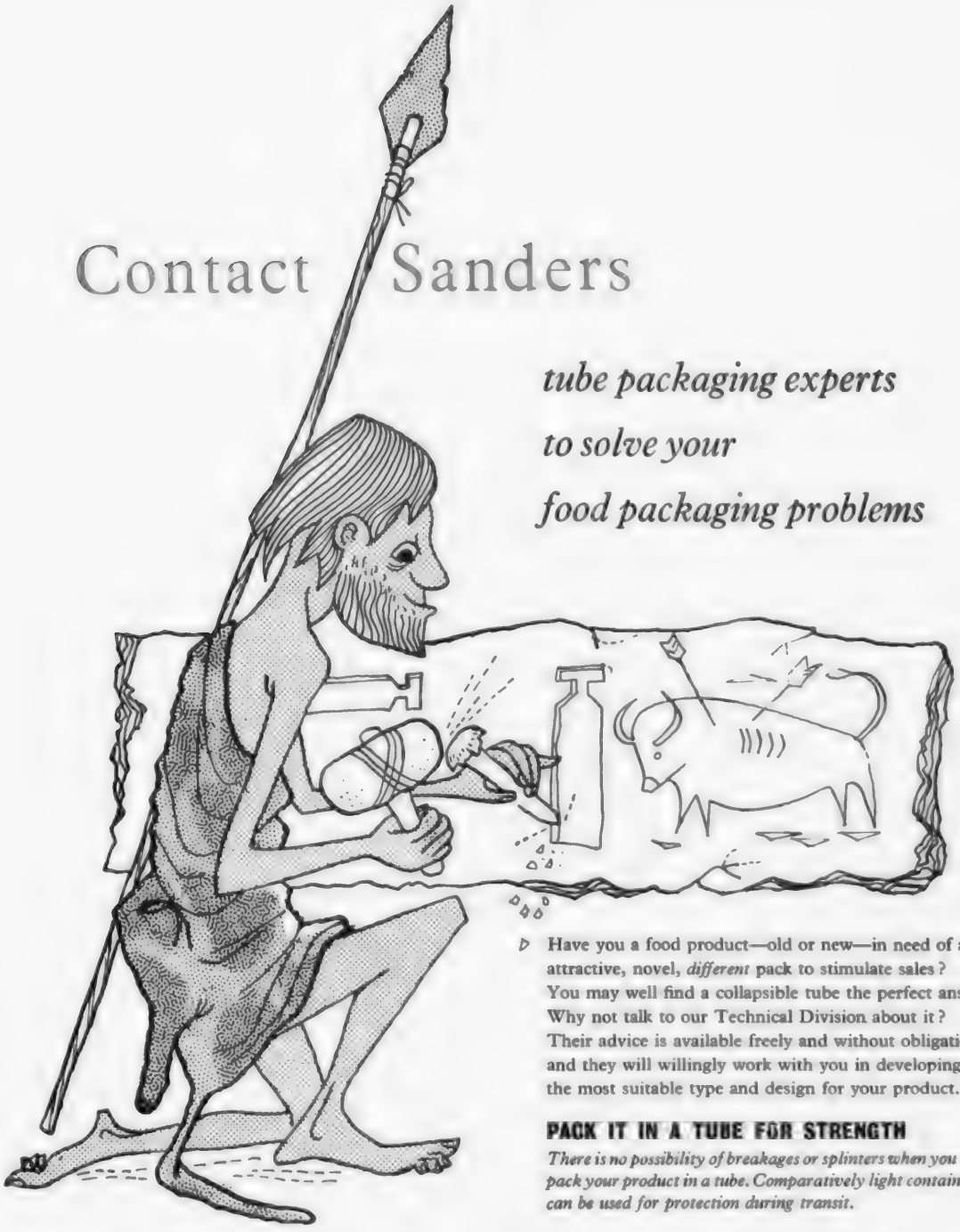
The last word in Filling Machines — by KELLIE — of course

ROBERT KELLIE & SON LIMITED, DUNDEE, SCOTLAND

Telephones: 2819 Dundee (2 lines). Telegraphic & Cable Address: "Kellie," DUNDEE, Code, A.B.C. (5th Edn.)

Contact Sanders

tube packaging experts
to solve your
food packaging problems



Have you a food product—old or new—in need of an attractive, novel, *different* pack to stimulate sales? You may well find a collapsible tube the perfect answer. Why not talk to our Technical Division about it? Their advice is available freely and without obligation, and they will willingly work with you in developing the most suitable type and design for your product.

PACK IT IN A TUBE FOR STRENGTH

There is no possibility of breakages or splinters when you pack your product in a tube. Comparatively light containers can be used for protection during transit.

SATURN

SANDERS

SANDERS FOR PACKMANSHIP *(Our 132nd year)*

COLLAPSIBLE TUBES • RIGID METAL CONTAINERS • SPECIAL PACKS
BOTTLE CLOSURES • SPRINKLERS • PRESSINGS AND COMPONENTS

H. G. SANDERS & SON LTD., Saturn Works, Gordon Road, Southall, Middlesex. Tel: SOUthall 5611.

In bread bakeries and in biscuit factories, in flour mills and in bulk delivery vehicles, the Simon Aeroflow Conveyor is used to move flour quickly and cheaply from one place to another. It has no moving parts, needs only the minimum of maintenance and provides the most hygienic method of conveying flour in bulk. That 'shelf' down its centre is a porous tile: compressed air in the lower duct flows evenly through the tile and makes flour in the upper chamber flow like water along the length of the conveyor. The conveying rate is under the control of a valve. The Aeroflow conveyor is just one of the many devices developed by Simon to give a bonus to the baker. Find out today how bulk flour handling and storage can cut costs and increase profits.

SIMON BULK FLOUR HANDLING AND STORAGE

HENRY SIMON LTD · CHEADLE HEATH STOCKPORT · Telephone Gatley 3621 (16 lines) Telex 66-287

HS/314PS

"Window cartons give us the selling visibility we need"

"The window carton is one of our most effective salesmen", says Mr. James J. Hall, Sales Manager of Henry Telfer Ltd. "It stimulates impulse buying—shoppers can see and appreciate quality."

And like other leading food manufacturers Telfer's find that sparkling Clarifoil is the ideal film for windows that stay fresh and transparent, lie flat without wrinkling . . . and never stop selling! When you package in window cartons, make sure you specify Clarifoil.

Plastics Division · British Cellulose Limited

Clarifoil
TRADE MARK
TRANSPARENT ACETATE FILM
sells on sight

Internal Lacquers

In the new Venesta Tube Factory the most modern internal lacquering equipment and techniques are used to ensure:—

1 Adequate coating weight over the whole length of the tube including the nozzle interior.

2 Continuity of coating to avoid danger of exposed metal.

3 Adhesion to the tube walls and maximum flexibility to prevent cracking and flaking during use.

A comprehensive Laboratory service is available to test customers' products and determine the most suitable type of internal lacquer, should it be required.

Consistently good

Venesta *tubes*

VENESTA

A product of the Venesta Packaging Division

VENESTA LIMITED • PACKAGING DIVISION • VINTRY HOUSE • QUEEN STREET PLACE • LONDON EC4 • Telephone: CENtral 3040

Too many cooks...?

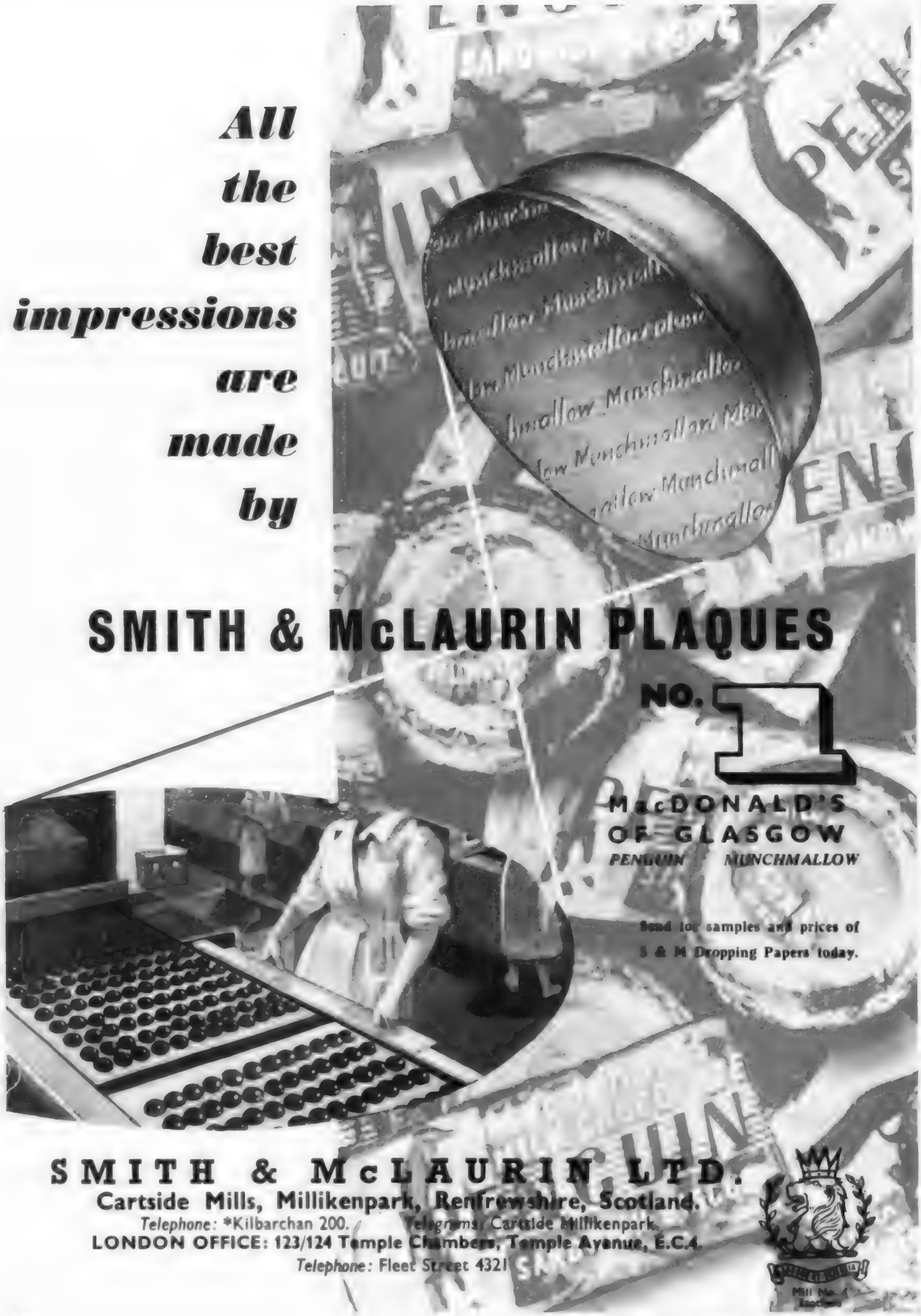
Many cooks . . . much prosperity. That's how *we* see it at any rate. And with more cooks employed by Bakers and Confectioners than ever before, business is obviously good. Quite rightly so. Standards are high and there is a wider choice than ever before. Of course we are biased, but we prefer chocolate on our cakes—especially the ones covered with our own. You really *can* taste the difference. But don't take our word for it—test Caxton yourself. You'll favour its economy, smoothness and fluidity, too. If you do have too many cooks let us advise you on the ingredients for your broth.

... *consult* Caxton

for CHOCOLATE COUVERTURE and TECHNICAL ADVICE

LIQUID BULK DELIVERY SAVES LABOUR, TIME, MONEY

CAXTON CHOCOLATE COMPANY LIMITED · LONDON · N.22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about FOOD...

Edicol Supra colours are widely known
for their purity and reliability.
Like all I.C.I. products,
these foodstuffs colours meet the very highest standards of quality
and are backed by comprehensive technical service.

D.791A

IMPERIAL CHEMICAL INDUSTRIES LIMITED LONDON SW1 ENGLAND

A New SCREEN for Old PROBLEMS - for the first time

LARGE SCREEN
GYRATORY MOTION

in VERTICAL & HORIZONTAL planes

The radial and tangential forces applied to the screen can be altered and adjusted to any local distribution pattern.

Flexibility of screen combinations permits up to 4 separations.

NO skilled labour is necessary to install, operate or maintain.

Where capacity and efficiency are important factors, we advise test in our Trial Laboratory.

INCREASE YOUR THROUGHPUT

William Boulton Limited

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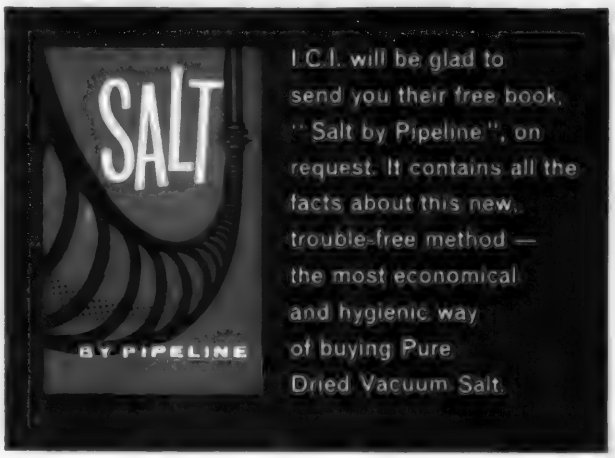
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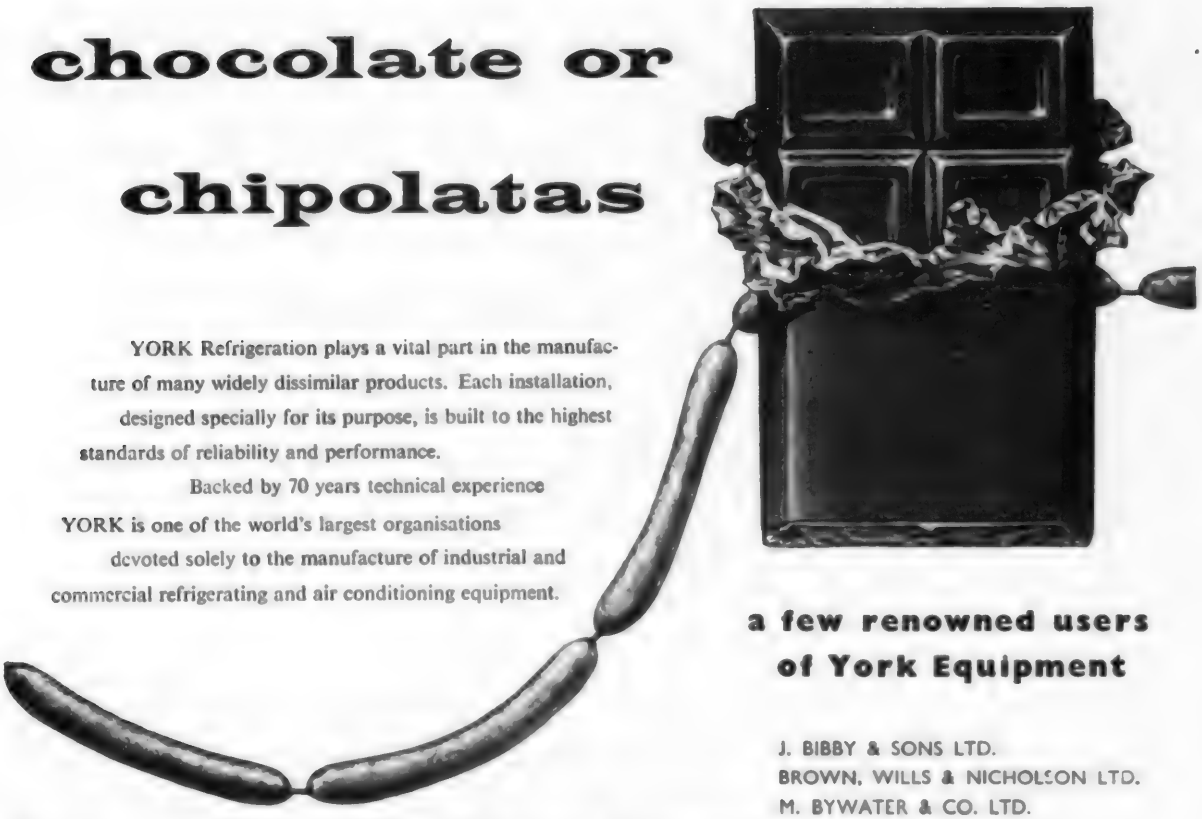

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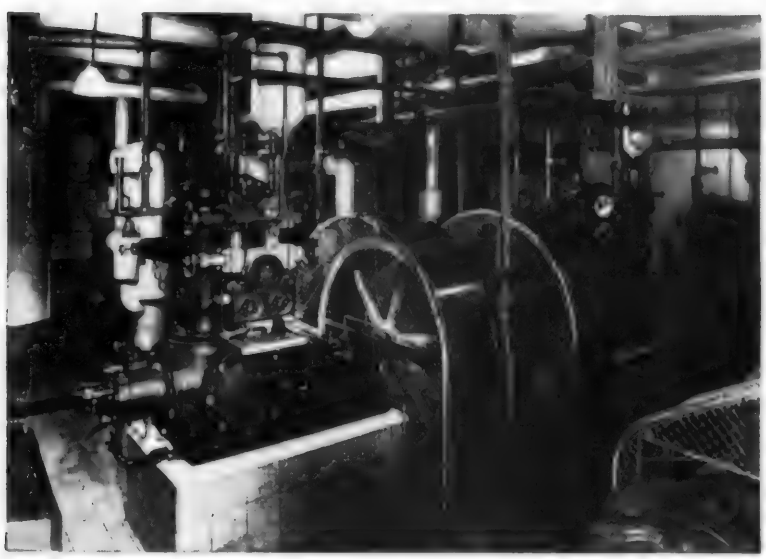

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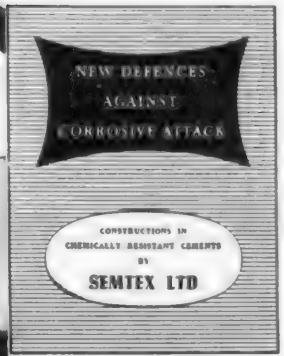

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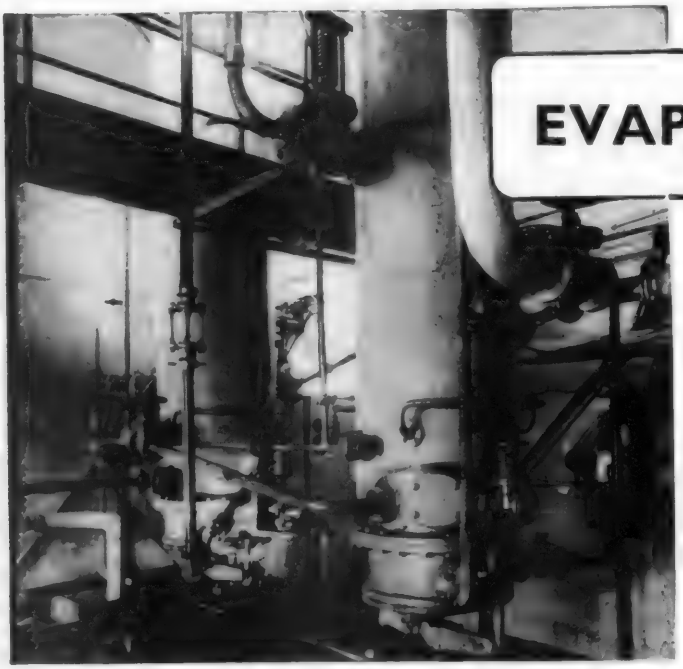

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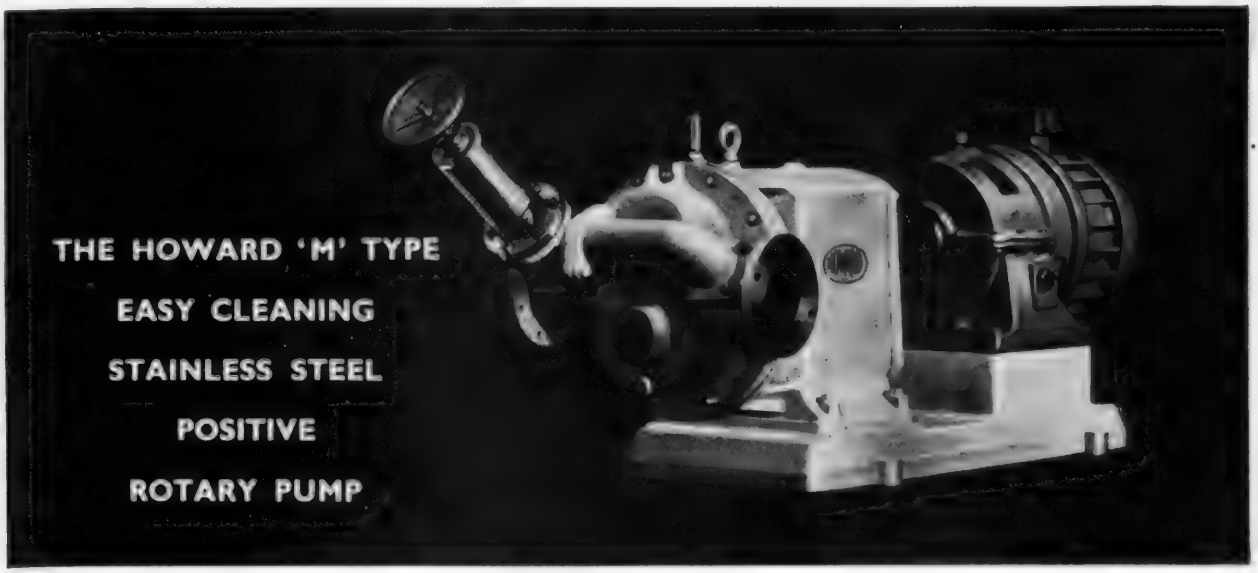

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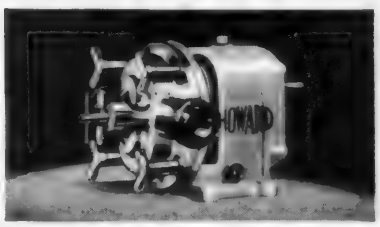
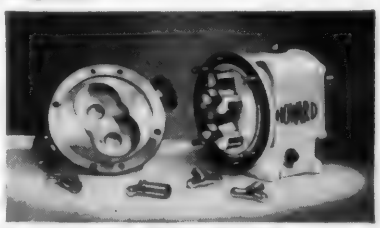


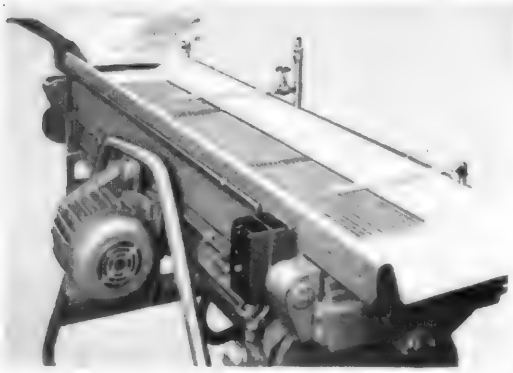
1. Slacken off the four Rotor Case Retaining Wing Nuts.



2. After removing the four wing nuts, proceed to take off the Rotor Case by gently sliding it off the four studs.

3. Unscrew the two Rotor Retaining Nuts, slide the Rotors off shafts.

4. After removing the Rotors, pull the backplate forward over the two shafts; all components may then be cleansed with boiling water, or detergent.



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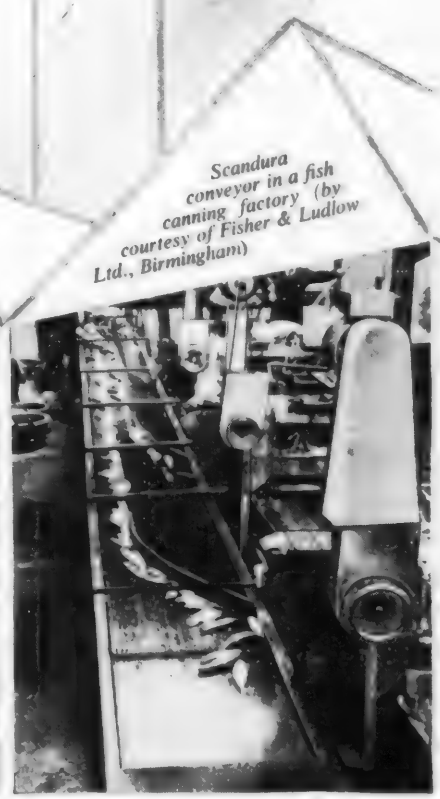

Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

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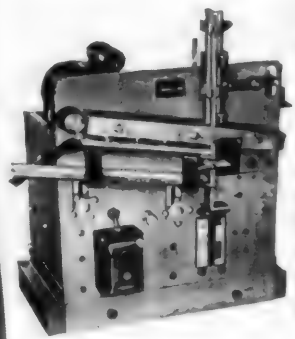

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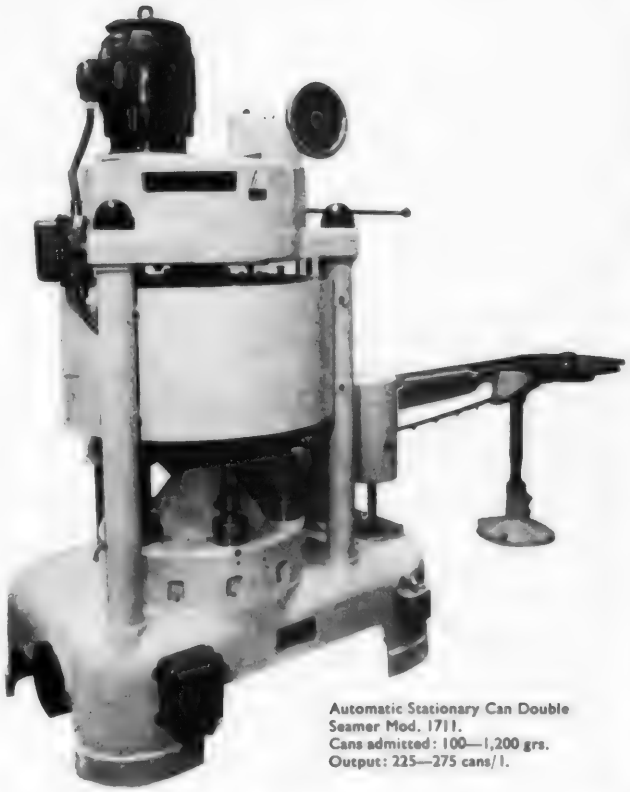

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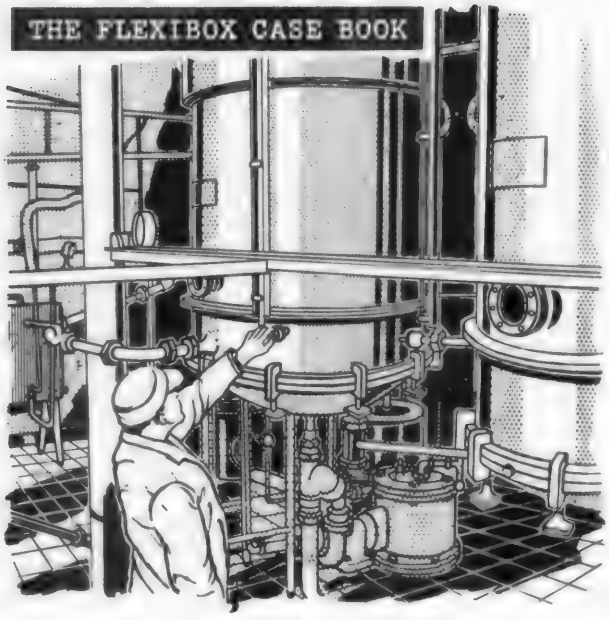

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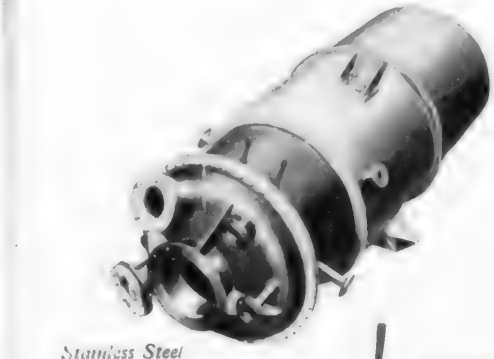

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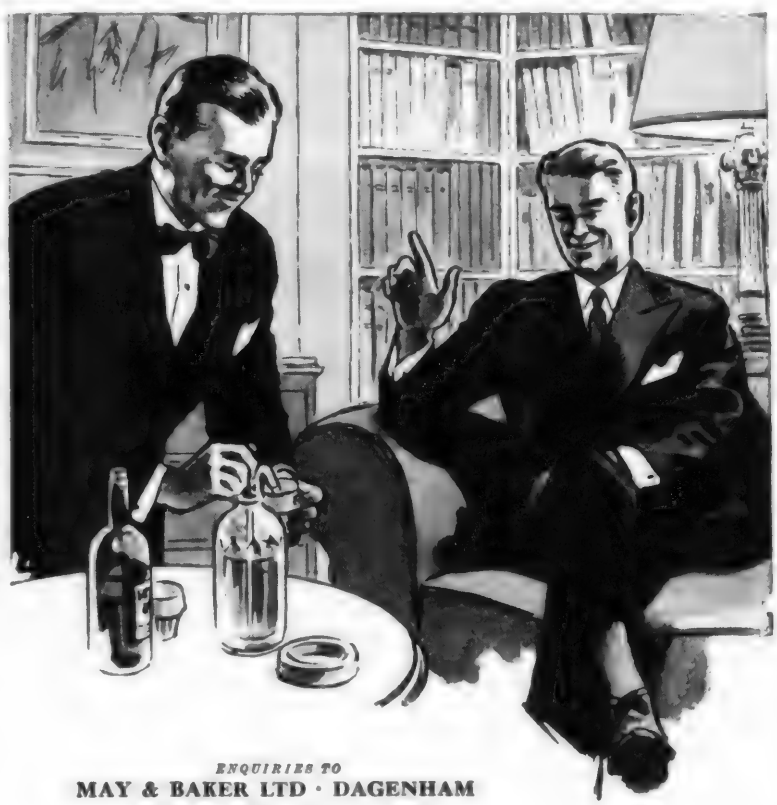

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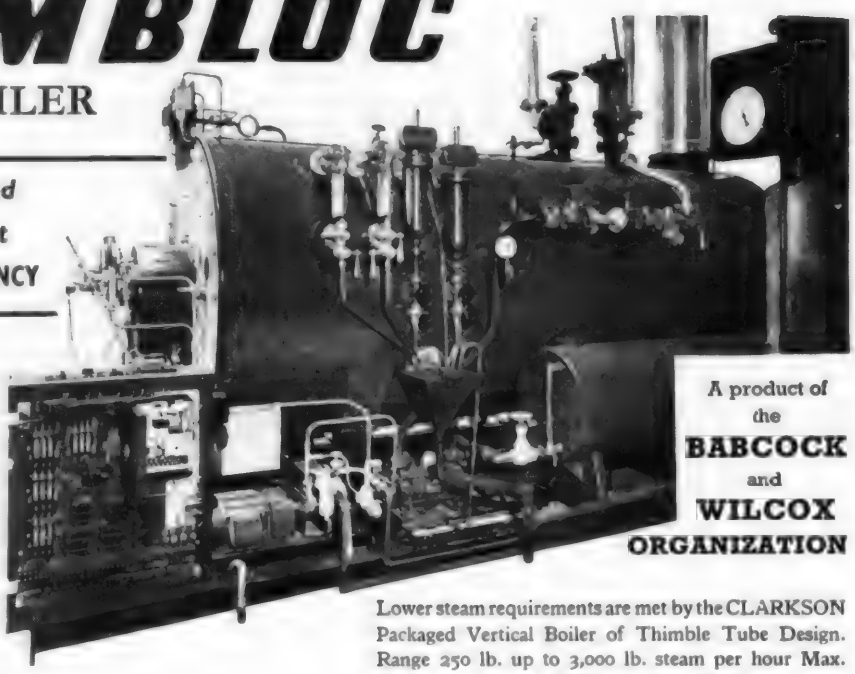

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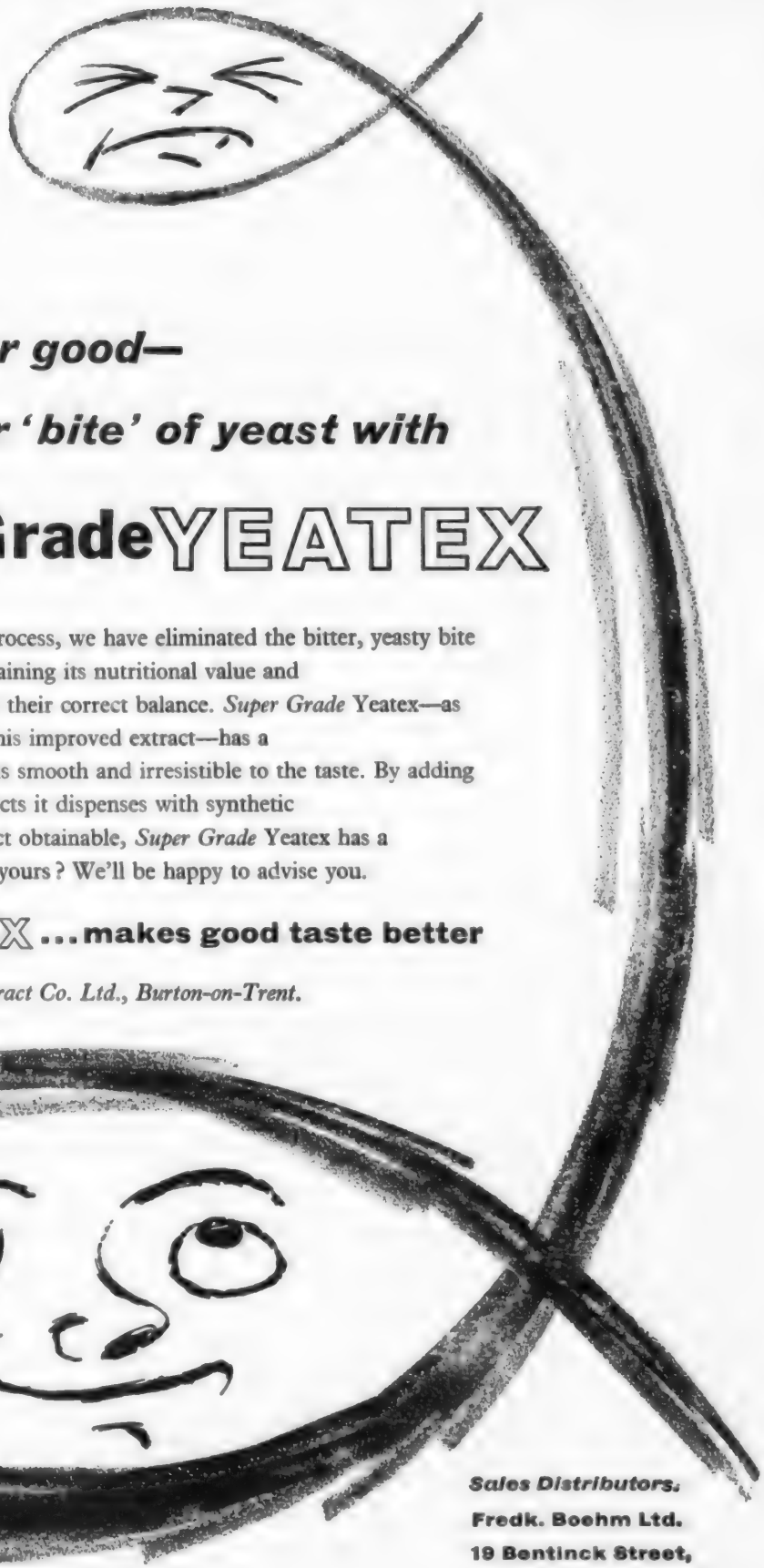

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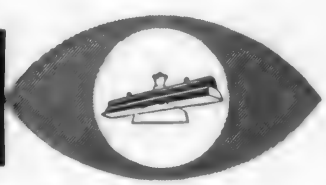

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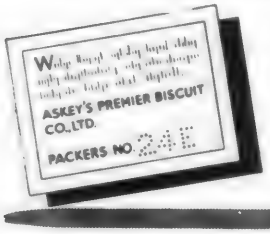

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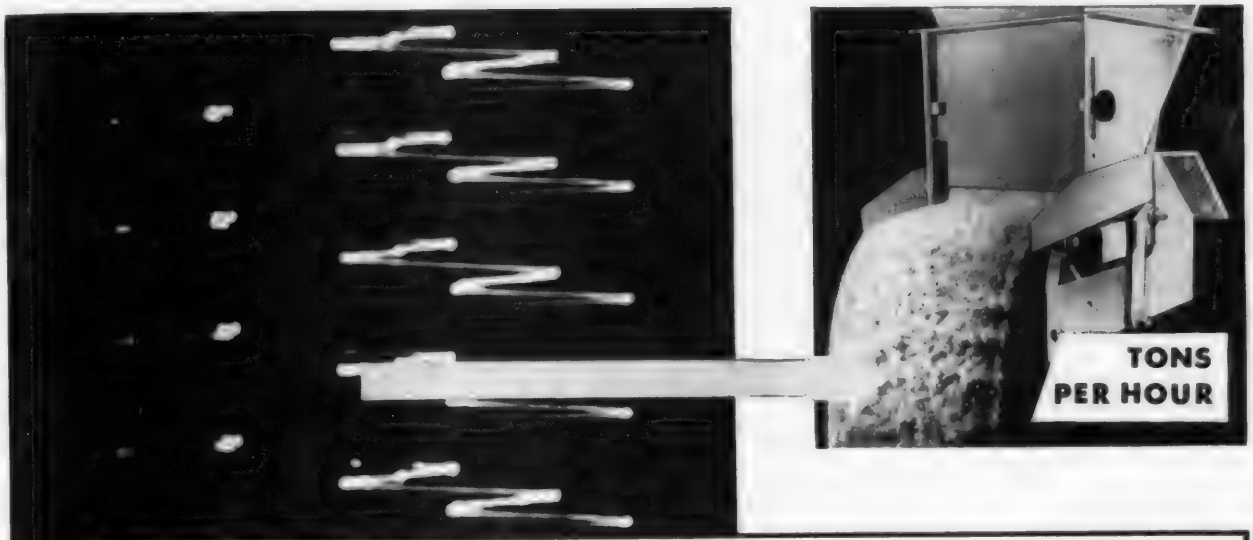

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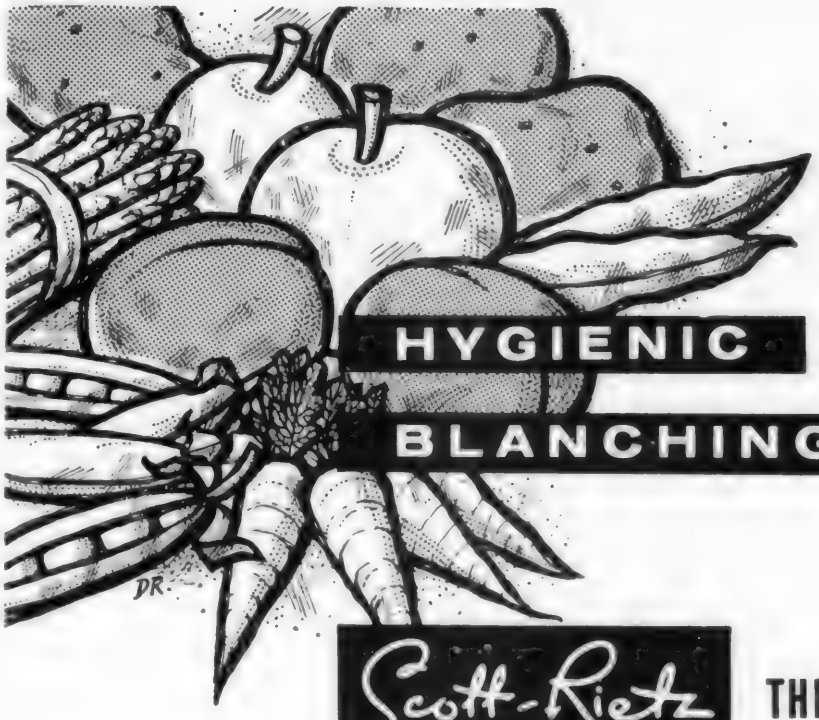

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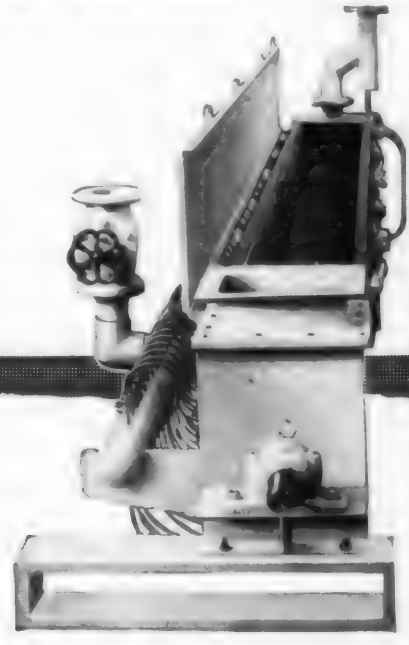

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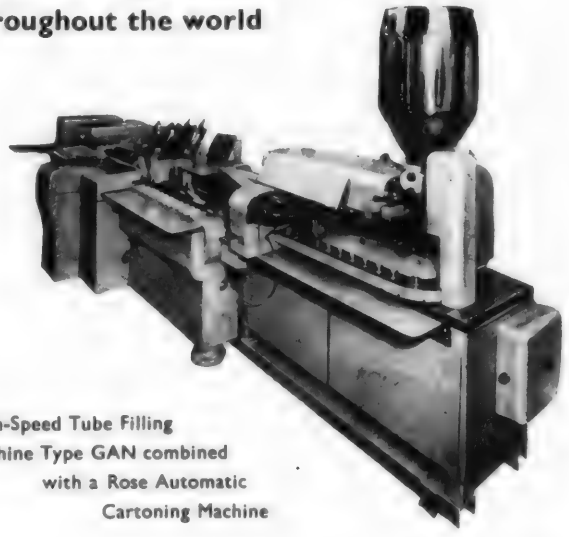

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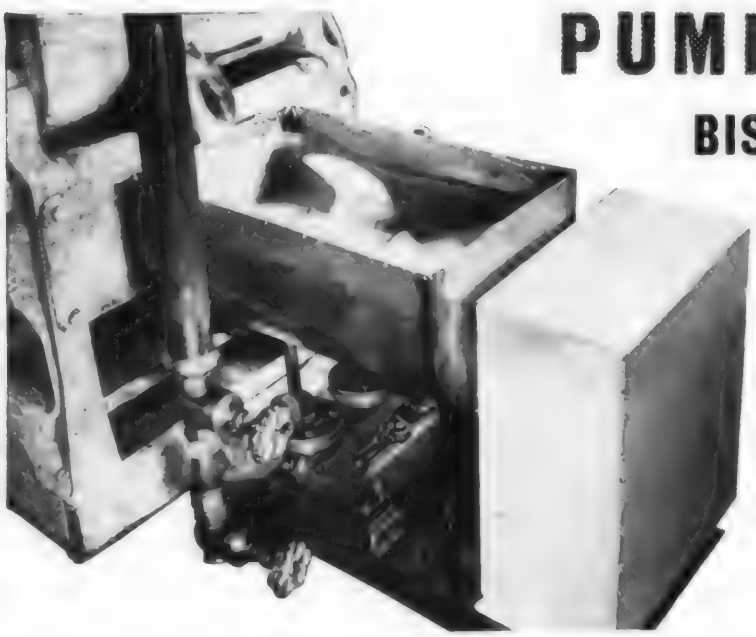

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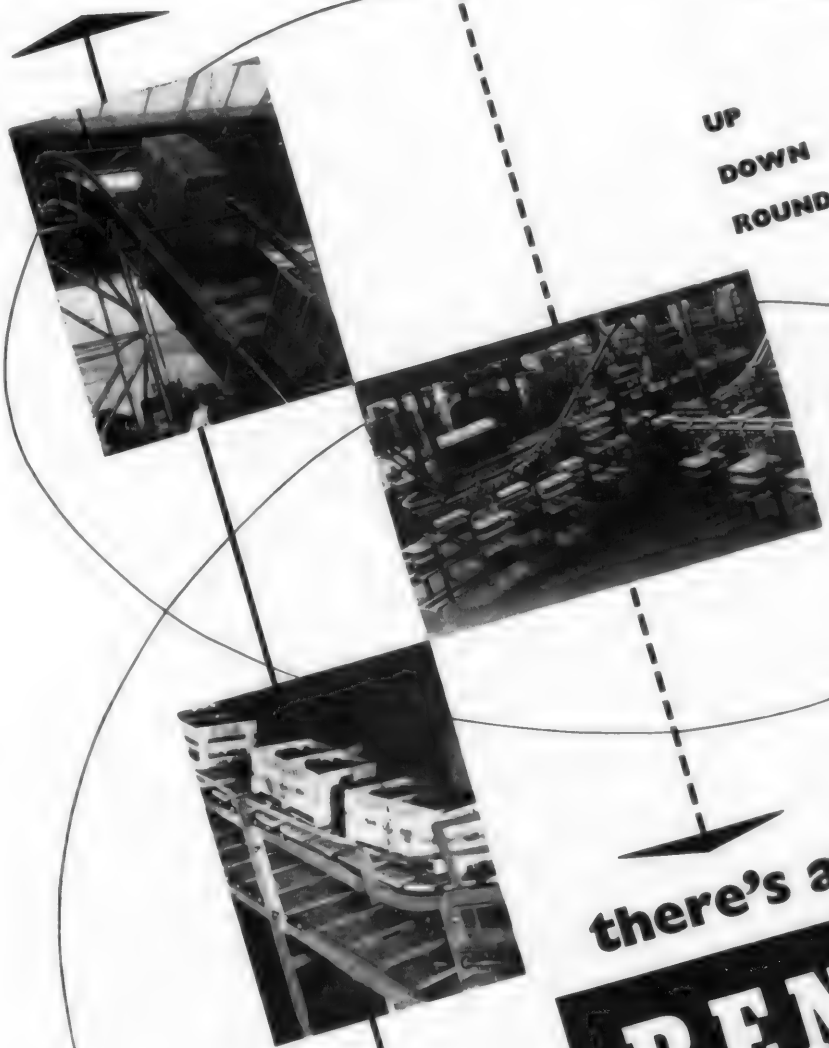

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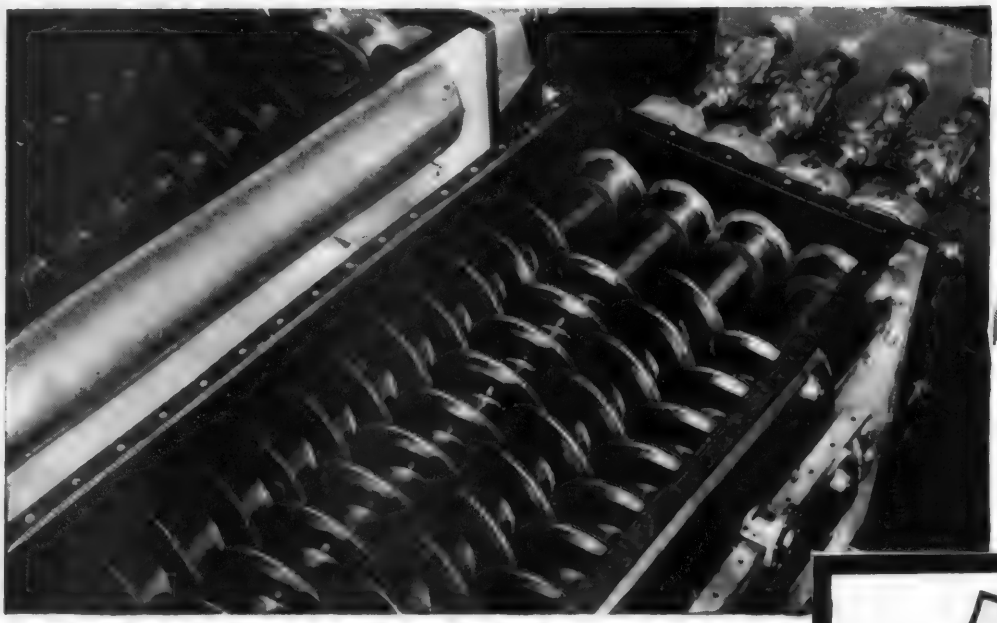

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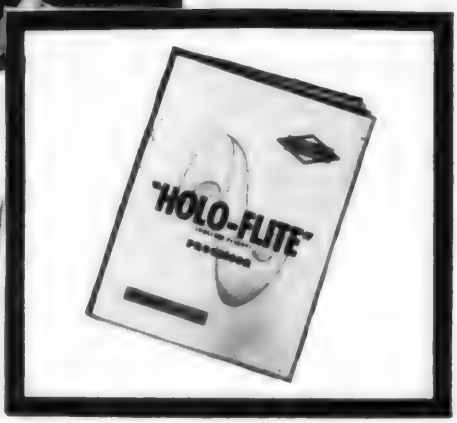

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FOOD MANUFACTURE

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FOOD MANUFACTURE

Vol. XXXIII, No. 3 March 1, 1958

Control of food poisoning

STEPS to be taken in England and Wales by Medical Officers of Health in the investigation and control of food poisoning are detailed in a publication issued recently by the Ministry of Health. The reported incidence of food poisoning shows no sign of decreasing, and there were 6,898 outbreaks (including family outbreaks) between 1950 and 1956: the causal food was named in less than a third of these outbreaks, and the organism was identified in approximately only two-thirds of those outbreaks in which a particular food was incriminated. The number of sporadic cases notified has increased from 2,987 in 1950 to 6,534 in 1956, and information regarding the source of these cases is limited.

Investigations of outbreaks have, however, revealed some important factors in their causation and these are listed in this report. Most of the outbreaks due to bacterial contamination follow the eating of food prepared in kitchens attached to communal establishments such as schools and canteens. Particularly suspect in this connection are articles of food such as stews and custards which have been prepared on the day before and have been allowed to cool slowly. Bacterial contamination can occur very readily in such foods.

The clinical features of the illness associated with various types of food poisoning agents are also discussed. These include those of chemical poisoning, which is rare. Instances reported have included zinc poisoning from galvanised iron containers used for stewing acid fruit and poisoning by metallic tin from sardines in tomato sauce. Antimony poisoning has resulted when a drink containing citric acid had been held in enamelware of inferior quality.

With regard to bacterial food poisoning, it is realised that the general symptoms of food poisoning are often indistinguishable from those of several common communicable diseases, and the Registrar General has now requested Medical Officers of Health to include notified cases of food poisoning in their weekly returns and also to make a quarterly return of the total of such cases amended by reason of corrected diagnosis.

The Food and Drugs Act, 1955, does not give power to Local Authorities to order a temporary closing of food premises to prevent the sale of food which may be infected, but powers are available to stop the sale of suspected food, and to require the exclusion from work of food handlers who are suffering from infections involving certain food poisoning organisms.

Requirements concerning the handling of food, personnel, premises, equipment, etc., and restrictions of temperature applicable to certain foods, are laid down in the Food Hygiene Regulations, 1955.

Toxicity of plastics

FOR some time the use of plastics in contact with foodstuffs, both in the form of packaging materials and as tableware, has been rapidly increasing. The materials used have always been open to attack on the grounds that certain substances used in their formulation might contaminate the foods with which they came into contact, and so prove hazardous to public health. Despite the fact that no single case of poisoning from plastics products has ever been known in this country, the British Plastics Federation therefore decided some time ago to set up a committee with the task of creating, by co-operative effort, a standard for plastics in contact with foodstuffs. The committee consisted of plastics technologists, analysts and chemists, and was able to co-opt as its medical adviser a leading toxicologist. After lengthy consultations with leading authorities in this country and the United States, it has now issued its report.

The report points out that before any constituent of a plastic can constitute a hazard to health, it must be both inherently toxic and also extractable in dangerous amounts from the material in which it is contained. Nevertheless, it recommends that no scheduled poison should be added to a plastic intended for use in contact with foodstuffs, irrespective of considerations of extractability.

The report then goes on to enumerate the requirements of an adequate extractability test, and suggests a specific procedure which it is hoped will be adopted as standard practice throughout the industry. This procedure consists essentially of extracting the plastic material with water, acid, alkali, alcohol and oil

under standard conditions of concentration, time and temperature that are sufficiently severe to cover the most adverse conditions to which the plastic material is likely to be subjected in practice. Extracts are then analysed for their content of the suspected material. Amounts of the material extracted are expressed in relationship to the weight of the original plastic in the case of thin films, and to surface area of the plastic in the case of heavier materials, and a formula is suggested for relating the determined extractability of a substance to its known toxic properties in terms of a "Toxicity Quotient."

Finally, the report classifies into three groups, corresponding roughly to safe, suspect and toxic, a large number of plasticisers, stabilisers and other materials used in the plastics industry.

The initiative taken by the British Plastics Federation in setting up these standards for its own industry is wholly to be commended, and one hopes that it will receive the fullest co-operation from the industry in getting them universally accepted.

More butter than margarine

FOR the first time in post-war years it is estimated that the consumption of butter has exceeded that of margarine. In 1956 butter consumption in the United Kingdom was estimated to be about 15½ lb. per head, a rise of 1 lb. on the year before, margarine consumption dropping by about 1 lb. to 17 lb. This trend continued in 1957.

According to the review of dairy produce issued by the Commonwealth Economic Committee the prime factor in this increase is thought to be that the U.K. is the only country importing without restriction.

The Committee reports that the world production of butter reached a level in the past year almost as great as that reached in 1950, the post-war peak year. Shipments from the Commonwealth countries have mainly reflected lower production in the 1956-57 season, but Eire, Sweden and Finland managed to export a surplus at prices below those on the domestic markets.

The United Kingdom now manages to cover about half of its total requirements of milk products, including all of the milk sold for liquid consumption and about half of the cheese from domestic sources, while some condensed milk is exported. Commonwealth countries have shared in the growth of world production of skimmed milk powder, both New Zealand and the U.K. establishing records in 1956 for production. Shipments from U.S.A. had increased during 1957, but most of the increase was distributed as donations for welfare purposes.

* *Dairy Produce*. Report by Commonwealth Economic Committee. H.M.S.O. 5s. net.

The Commonwealth produced a greater share of the world production of cheese in 1956, but its exports declined to about 30% of the world total, compared with almost half in 1938, when Canada was the third largest exporter in the world. Prices in U.K. had declined to their lowest since 1951 following a further rise in home production.

Canned beer illegal?

THE popularity of canned beer has increased markedly during the past year or so, and this trend has formed the subject of several comments in these columns. The surprising suggestion has now been made that the sale of much of this beer actually contravenes the law. In his annual report, Mr. S. W. B. Marshall, Chief Inspector of Weights and Measures of the City of Leeds, points out that section 130 of the Licensing Act, 1953, states: "If a person sells, or allows any person under his control to sell, intoxicating liquor by retail in quantities of half a pint or more except in a cask or bottle or in a measure marked according to imperial standards, he shall be liable on a first conviction to a fine not exceeding £10. . . ."

Mr. Marshall points out that unless a metal can is accepted as a cask or bottle, the sale of such cans containing not less than half a pint of beer would not appear to be in compliance with this act, as they are not stamped measures. He suggests that the law should be amended to cover the use of cans for this purpose, and the likelihood of any publican being prosecuted for this technical infringement of the law is probably remote. None the less, this example underlines the necessity for any manufacturer introducing a new package to ensure that it does not by its nature, size or label infringe one of the many laws now governing the sale of foods and beverages.

Animal fats for animal feeds

ACCORDING to the results of various studies carried out in the United States, considerably better feed conversion can be obtained by increasing the animal fat content of feeds for several kinds of farm animal. A recent report discusses a trial in which 2, 10, and 18% of fat was used in the diets for different lots of chicks. There was no apparent difference in the average weight of 8-week broilers from the three groups, but feed conversion increased with the fat level. A decided lowering in the feed cost per pound of broiler was also noticed as the fat level of the diet increased. The report concludes that in practice 10% would probably be the upper limit of fat which could be handled with present equipment, particularly as levels above this are not suitable for use with existing self-feeders.

Laying flocks present a somewhat different problem. The rate of egg production was found to be generally unaffected by adding fat to the diet, but a definite improvement in the efficiency of food utilisation was noticed with fat added up to a 5% level.

Dealing with the raising of hogs, the report claims that hogs can utilise up to about 10% of fat with an improvement in feed conversion and often an improvement in rate of gain. Cattle can utilise up to about a pound of fat per head per day, but higher levels may disturb the action of microflora in the rumen.

Proper balancing of rations containing fat is important, and the feeds must contain enough proteins, vitamins and minerals to meet the lowered total food intake which results from the high calorific value of the fat incorporated. A calorie to protein ratio of about 42 is said to be generally acceptable, which means that a diet containing 10% of fat may require 25 to 26% protein if the most economical results are to be obtained. The high cost per pound of these high-energy, high-efficiency diets is said to be more than offset by the economies achieved in their use.

As the report points out, as little as 2% fat in animal feed improves their appearance and completely eliminates the dust problem, and its addition is probably worthwhile for this latter reason alone. With the traditional markets for animal fats—as edible lard and for use in soapmaking—being hit increasingly by the competition of vegetable shortenings and synthetic detergents respectively, the potentialities of this new market would appear to be well worth investigating.

Odour aids insect control

THE use of substances powerfully attractive to insects as a means of luring insect pests to their doom appear to be meeting with considerable success in America. Scientists of the U.S. Department of Agriculture are reported to have developed several natural and synthetic chemo-attractants which are proving useful weapons in combating such pests as the gypsy moth and the Mediterranean fruit fly. The attractants can be used to entice the insects to baited traps or to induce them to consume material heavily poisoned with insecticides. For use against the Mediterranean fruit fly, the secbutyl ester of 6-methyl-3-cyclohexene-1-carboxylic acid, which is now being used to replace the natural attractant angelica-seed oil, appears to be the most effective compound yet discovered.

From the food manufacturer's point of view, the use of these compounds would seem to have considerable potentialities in the protection of stored raw materials. Such commodities as spices and cereals in storage are notoriously prone to insect infestation, and the use of these attractants in conjunction with existing baits and insecticides would appear to offer interesting possibilities.

Advertising ethics

WITH television advertising now wielding unprecedented powers of persuasion, the subject of advertising ethics, particularly in the field of food products, has become more than ever one of general public concern. The question of Governmental powers of control also arises. The substance of two timely addresses on these related aspects of the subject—legal and ethical—has recently been published.*

The ethics of advertising is a subject which has called forth caustic remarks from several sources, and many people clearly have very strong views on the subject. The exact legal position of advertisers is perhaps not so well known, however, even by the advertisers themselves, and the remarks of Mr. C. A. Adams, a former director of the Food Standards Division, Ministry of Food, on food advertising law are particularly interesting. It is somewhat surprising to learn, for example, that it was not until the passing of the 1938 Food and Drugs Act that advertising was specifically mentioned in connection with these commodities, though powers to restrain anyone from issuing false or misleading trade descriptions of goods in general have existed since the Merchandising Marks Act of 1887. Moreover, the 1938 Act itself did not come into force before the war began, and it was not until the Defence (Sale of Food) Regulations of 1943 that administration of the Act effectively began. These regulations also gave added powers for the prevention of misleading statements on either labels or advertisements concerning nutritional or dietary value, and for the restriction of claims concerning vitamin and mineral content, but powers to regulate food advertisements in the same way as food labels were not granted until the Food and Drugs Act of 1955.

Even now, there is no sign of a Food Advertising Order corresponding to the existing Food Labelling Order being issued, but the powers to deal by regulation with any trends in food advertising considered to be unethical or contrary to the consumers' interests now definitely exist, as Mr. Adams points out.

Discussing the nature of such trends—real or potential—Mr. Adams attacks particularly the practice of making special health and pseudo-medical claims for certain foods, particularly where this is linked with the suggestion, usually quite spurious, that the claims are backed by medical opinion. He also criticises the energy claims made for many foods on the basis of their glucose content. As he points out, these claims are particularly worthless when ap-

* *Chemistry and Industry*, **1958**, 116 and 120.

plied to fruit drinks, since the sucrose normally contained in such drinks is itself completely inverted within a day or so of their manufacture.

In another paper dealing with the ethics of food advertising, Mr. Ernest Godbold, an advertising agent, follows up this theme, and lists a short code of honest advertising. Both authors agree that such bodies as the Advertising Association have done excellent work in controlling the more objectionable forms of advertising, but that there is still considerable scope for improvement.

Bright future for seaweed

A ROSY future is seen for seaweed as a food and fodder supplement. The ash content of seaweed may be anything from 15 to 25% of its dry weight, and it contains some 60 minerals in traces and micro-quantities. The fat and protein content are about the same as for vegetable matter generally, but vitamin contents are reported as being exceptionally high, especially in regard to carotene, vitamin B_1, vitamin E, folic and folinic acid, and vitamin B_{12}. Seaweed is, in fact, the only known vegetable source of the last-named vitamin.

It is for its value as a mineral supplement, however, that seaweed is principally used. It is true that many of the minerals it contains have not as yet been shown to be essential in animal nutrition, but our knowledge of this subject is almost certainly still incomplete. The use of seaweed as a direct food supplement, or as a fertiliser to put back into the land —and hence into land-grown crops—elements which have been leached out over years of cultivation, and are not returned through the medium of ordinary fertilisers, would therefore seem to be a desirable, far-seeing policy, even if its direct usefulness had not been demonstrated. If some of the claims recently made for the value of seaweed supplements are substantiated, however, its use will prove to be of much more immediate value. Discussing the uses of *Algit*, a brand of seaweed meal produced by a Norwegian firm, a recent publication of the Norwegian Exports Council gives details of several beneficial results observed from the use of this substance as a food supplement. Reports from Utrecht Veterinary University showed a 10% to 20% increase in the blood hæmoglobin of animals which had received a 3% supplement of the meal for 3 months. Other feeding experiments in Holland are reported to show an increase in the production and vitamin A content of milk from animals fed the seaweed meal.

In sheep farming the feeding of seaweed meal is reported to give rise to more lambs, more and better wool, and pelts of exceptional quality. Pigs are said to reach slaughtering size more quickly. Old hens which have ceased to lay are reported to have commenced laying again after the addition of 5% *Algit* to their diets, and a larger proportion of A1 eggs are said to be produced by laying hens receiving the supplement. The chairman of the Turkey Breeders' association of British Columbia has reported that after the use of a similar supplement there was no mortality for the first year on record. Favourable reports have also come from breeders of fur animals and from salmon and trout nurseries.

Perhaps the most far-reaching claim comes from Colombia, where a consultant to the Race Horse Owners' Association has written that after the addition of *Algit* to their fodder for 14 days all horses broke their previous individual records!

The widespread sources of the claims and the official standing of some of the people making them none the less demands that they be considered seriously.

Protecting the vitamin

LACK of vitamin A is the chief nutritional deficiency of skim milk, the vitamin being removed with the fat in the skimming process. Enrichment is the obvious method of making skim milk a more useful commodity and the availability of synthetic vitamin A makes this a straightforward matter. The snag is the extreme susceptibility of the vitamin to oxidative destruction during storage, particularly in the tropics. A method of protecting the vitamin when added to skim milk has now been proposed by Conochie and Wilkinson of the C.S.I.R.O. at Highett, Victoria. It is appropriate that the problem is being tackled in Australia, because at the moment only about 10% of the 300,000 tons of skim milk annually produced there is used for human food.

The C.S.I.R.O. workers propose to dissolve synthetic vitamin A acetate in peanut oil into fully hydrogenated coconut oils containing tocopherols and lecithin. This is homogenised into pasteurised skim milk and added to skim milk concentrate before spray drying. They have tried out the process batchwise and it works sufficiently well for them to consider adapting it to continuous operation. What they are doing is to protect the vitamin by placing it in a carrier which is not readily oxidised. The other additives are not only harmless but necessary to health. Tocopherol has a sparing action for vitamin A and promotes its absorption and deposition in the liver. Lecithin has a synergistic effect with tocopherol in combating fat oxidation.

The new process seems an admirable compromise between such costly protective measures as packing under inert gas and controversial ones such as using chemical antioxidants.

FOOL-PROOF FORMULATION

Batchelors Install Electrical System to Control Soup Mixes

At the new factory now being erected by Batchelors Foods Ltd., at Ashford, in Kent, an elaborate system of electrical control prevents errors in the formulation of soup mixes. FOOD MANUFACTURE recently visited the factory to see the process.

THE firm of Batchelors, like many other food manufacturing concerns in this country, began in a small way towards the end of the nineteenth century. Using as his first premises the cellar of a disused Methodist chapel in Sheffield, William Batchelor, the founder of the firm, began in 1895 to fill tea into packets bearing his name. He soon acquired a considerable number of satisfied customers, and when he turned his attention to packing dried peas, he was able to bring to his new enterprise the reputation he had built up for "selected quality" goods. Previously, dried peas had been sold loose, ungraded and unbranded, and William Batchelor found that his product, packed in cartons after careful selection, met with a ready sale.

Dried peas, however, need long soaking and cooking, and at a time when the idea of ready-prepared foods was in its infancy, Batchelors set out to save the housewife the trouble of soaking and cooking the peas. In 1928 they perfected a method of soaking the peas in the factory, and of canning and cooking the product, so that it only needed warming before it was ready to serve. The day of "processed peas" had arrived.

William Batchelor died in 1913, and was succeeded as head of the company by his daughter, Ella (Mrs. E. H. Gasking). She continued to develop the business with her brothers, Maurice and Fred, until she retired in 1948, when the chairmanship passed to Lt.-Col. Maurice W. Batchelor.

The company became a member of the Unilever organisation in 1943, and three years later took over the old-established firm of Poulton and Noel in Southall, which then became Batchelors Peas (Southall), Ltd.

The battery of ingredient hoppers, each of which is electrically controlled.

Since then its activities have continued to expand, a fact reflected in the recent change of name to the more embracing title of Batchelors Foods, Limited.

Dried soups

One of the newer activities for which the firm of Batchelors has become well known throughout the food trade is the production of dried soups. Packed in aluminium foil packets of minimum bulk, these soup mixes represent the last word in the preparation of soup ingredients. They save the packing and transport of large quantities of water which must inevitably accompany the marketing of canned soups, and whilst ensuring that all tedious preparatory work is eliminated they nevertheless allow the housewife to have some hand in the cooking of the final product. At present, seven varieties, comprising Thick Pea, Thick Vegetable, Clear Vegetable, Onion, Mushroom, Celery and Chicken Noodle soups, are prepared, and the company hopes to increase the number of varieties available as public demand grows and manufacturing facilities are increased.

The Ashford factory

With this necessity for increased manufacturing facilities, not only for their soup mixes but for their other products, in mind, Batchelors have for some time been engaged on the construction of a large new factory at Ashford in Kent. With many products, particularly garden peas and the choicer fruits, it is essential that as little time as possible elapses between the harvesting of the crop and its processing in the factory. It is therefore impossible for any factory to draw its raw materials

Batchelors new factory at Ashford. The ground floor of the building on the left contains extensive canteen facilities, whilst the upper floor consists of offices. Part of the main factory buildings are shown on the right.

from an unlimited area, as beyond a certain radius transport difficulties become acute. By siting their new premises as they have, Batchelors hope to draw on a new area of fertile farming land, and to ensure that the delays arising during the transport of the raw materials from the farms to the factory are kept to a minimum.

The factory as a whole is not yet in production, but the manufacture of soup mixes has already been transferred from the Southall factory and is carried on under the control of Mr. H. G. Faulkner, General Works Manager of the Ashford factory.

Dried peas

One of the first operations in the production of soup mixes is the preparation of the dried split peas which are used in the formulation of the thick pea soup. The peas as received are dry, but they are, of course, uncooked, and as they require a considerably longer cooking period than the other ingredients in the soup, they have to be soaked, partly cooked and then dried again before they are incorporated in the soup mix.

The peas are first soaked in four stainless steel tanks, each tank holding 11½ cwt. of peas. The peas are covered with water, and during the soaking period they take up water to the extent of 75 to 100% of their original weight.

The soaked peas are flumed from the tanks in the soaking water and collected in shallow trays, the flumes being open in construction to facilitate cleaning operations.

The trays of peas are then laid on to small horizontal retorts and cooked for 40 minutes, during which period the steam pressure is varied.

The peas show some tendency to agglomerate into lumps during this cooking process and on removal from the retort they are poured on to a vibrating table, which has the effect of breaking up any such lumps. The peas are then spread on mesh drying trays, which are loaded on to tall trolleys, ready for the drying operation.

Drying is done in two stages. At this time the peas contain about 50% moisture, and in the first stage of drying this is reduced in Briggs dryers to about 20%. These dryers operate on a simple cross draught principle.

During this first stage of the drying operation the peas are fairly wet and there is therefore little danger of case-hardening occurring. Once the peas have been dried down to about 20% moisture content, however, drying must be somewhat more gentle, and the second stage of drying is therefore carried out in equipment of different design. The second stage dryer is a batch-type machine holding about 3,500 lb. of peas. It consists essentially of a circular chamber with a cone shaped bottom, into which the peas are loaded through a granulator, which breaks up any accretions which have formed in the first stage of drying and reduces the peas once again to individual units. The peas are fed into the top of the dryer by an air-lift system. During this time the hot air flow is maintained, and the peas are dried for a further period after the dryer is full. To prevent uneven drying, the peas are recirculated during this period. They are allowed to fall from the conical bottom on the dryer on to a vibrating conveyor, and this transports them back to the filling point, whence they are carried by the air-lift system back into the dryer.

The drying air is heated by passage through a steam heater and the peas are dried to a moisture content of 5 to 7%. When drying has reached this stage, the vibrating conveyor is swivelled round so that re-circulation is stopped and the peas are loaded from the conveyor into multi-walled paper sacks, in which they are stored. This storage period is never allowed to exceed 24 hr., as when dried to this degree after cooking the peas tend to be hygroscopic and to pick up moisture from the atmosphere.

Drying of cereals

The cereals used in the preparation of the dried soups have also to be dried to a low moisture content.

This has been done in the past on gas-heated band dryers, on tray dryers and also by spray drying. The firm is at present building new types of dryers and feels there is further work to be done to establish the best technique of cereal drying.

The noodles used in Chicken Noodle Soup are also dried at the factory, a conveyor dryer made by L. A. Mitchell, Ltd., being used for this purpose. The noodles

A general view of the filling department. Of special interest is the ceiling, which is clad throughout in aluminium to combat dust.

are blown up an air-lift at the rate of over 1,000 lb. per hr, and fed into the top of the dryer, through which they travel in three passes. Filtered air is steam-heated and is blown over the noodles in a counter-wise current. A portion of the extracted air is recirculated to maintain the correct humidity and prevent case-hardening of the product. The noodles enter the dryer with a moisture content of about 10% and leave it with one of about 3%.

Drying of chicken meat

Another commodity now being dried at the Ashford factory is chicken meat. The chickens are received at the factory partially dressed (technically, New York dressed) and they are first eviscerated and fully dressed. They are then steam-cooked in pressure retorts before the meat is stripped from the carcases. At the same time the edible giblets are cooked and the chicken fat is rendered.

An interesting feature of this process is that the whole of the chicken meat is used, none being removed for the manufacture of other products. The same proportions of white and dark meat are therefore included in the soups as occur on the actual birds. One of the results of this is to keep the colour of the dried chicken meat, and of the resulting soups, to a desirably light tone.

In the next stage of the process, the chicken meat and the cooked giblets are minced together and are then mixed with flour and salt.

The resulting mixture is extruded through a second mincer equipped with a fine plate, which reduces it to a fairly homogeneous mass. The mixture is then spread on trays of stainless steel gauze, ready for the drying process.

The drying takes place in cross-draught ovens, through which steam-heated air is passed at high temperature. The trays of meat are turned periodically and any lumps which have formed during the drying process are broken up. The drying process is continued until the mixture has been reduced from a moisture content of about 42% to one of around 3%.

Compounding the soups

About 60 different ingredients are used in the 7 varieties of soup mixes which Batchelors now prepare, and it is obvious that with this large large number of substances being handled at one time and another, mistakes would be liable to occur in the formulation of the soups unless special precautions were taken. The steps taken by Batchelors to prevent such mistakes can fairly be described as unique, at least in this country, for they represent a very advanced technique in the elimination of human errors.

The system used to control the formulation of the soups is an electrical one, custom-built for Batchelors by Elliott Bros. (London), Limited. It is based on the use of Hollerith punch cards and a Hollerith punch-card reader. The major ingredients are fed into a battery of 24 stainless steel hoppers, arranged in 2 parallel rows of 12. These can be seen in the accompanying photograph. The hoppers hold a full shift's supply in most cases, and the ingredients are fed from them by means of short vibrating trays. When compounding a batch of soup mix, the operator passes between the double row of hoppers, drawing ingredients from the appropriate ones into a stainless steel skip supported on a weighing machine, which is itself carried on a powered trolley.

Control of the formulation is exercised by an electrical system which serves each hopper. The formula for each variety of soup is first coded, and cards are punched according to this code. The appropriate card is then inserted into the reader, which is connected to an electrical control mechanism on each hopper. The reader selects the first ingredient to be added, according to the code on the card, and actuates the control on the hopper containing the ingredient in question. This is indicated by a light on the hopper. Material can then be drawn from this hopper, but from no other. As the material is withdrawn, the control mechanism on the hopper containing the second ingredient on the coded card is actuated, and the operator can then draw material from this second hopper. Thus, for instance, if the first ingredient on the coded card is—say—sugar, the hopper containing sugar is first actuated. No other hopper can then be drawn from until the hopper containing sugar has been used, and there is, therefore no possibility of the sugar being left out of the batch. Similarly, once

sugar has been drawn, the hopper cannot be operated again until all the other ingredients have been drawn in their correct order, and a new card inserted in the reader, so that there is no chance of a double dose of sugar being drawn.

As the system exists at the moment, the addition of ingredients is automaticaly controlled, although the actual amount added is still under the control of the operator. The firm is investigating the possibility, however, of extending the system to cover not only the order of addition of the ingredients, but also the actual amount of each addition. In the meantime, such quantity control is exercised by means of a printed card on the Berkel weighing machine used in this operation. The card is printed with the cumulative weight after the addition of each ingredient, so that the weight added can readily be ascertained. As the order of addition is controlled by the electrical system already described, a particular weight of the card must refer to a specific ingredient, and any error can therefore immediately be detected. A new card is begun with every batch of soup and the card accompanies the batch as it is elevated to the floor above when it is complete. Here a quality control inspector checks the card and signs it correct if no error has been made. No batch without a card, and none for which the card has not been approved, can pass on to further stages of processing, so that the system is as near fool-proof as can be devised.

On the upper floor, other ingredients, such as spices, which are added in small quantities, and fats, which are not suitable for dispensing from hoppers, are added to complete the mix. Where sticky ingredients such as purées and meat extracts are to be added, these are usually mixed first with flour, salt and other materials to take up their sticky nature, and then dried down to a flaky, granular material. Spices are premixed in bulk with a Hobart mixer and are then weighed out from this bulk stock.

The materials added at this stage are weighed out by hand, and their addition is noted on the batch card previously described. The batch is then tipped into a Morton mixer, a stainless steel machine containing a rotating double-Z arm. Here the ingredients are thoroughly mixed into a completely uniform batch. Finally, the completed batch is examined by a member of the quality control staff, who scrutinizes the batch card and actually cooks up and tastes a sample. If everything is satisfactory, he stamps the card in red ink and also signs it, and the approved batch can then be filled.

Another important operation which is carried out in this department is the scrutinizing of the vegetables used in the soup mixes. These are received dried in flake form in sealed tins, in which they are packed in an inert gas. The tins are opened and the vegetable flakes are tipped on to a short conveyor belt, where they can be examined carefully and any fragments of burnt material, stems, pieces of crown, etc., can be removed.

A final point of interest in this department is provided by the floor, which is constructed of studded aluminium. The studs give a secure foothold to operatives working in the department and the metal surface, which is of course, non-dusting, enables a department where dust tends to be a problem to be kept in a very clean and sanitary condition.

Filling the soup

The completed batches of soup, each of which weighs 200 lb., are tipped from the mixers into stainless steel trolleys, in which they are transported to the hoppers of the filling machines. Two types of filler are in operation—a volumetric type for those soups which are entirely in powder form, and an "auger" filler for those with a more paste-like consistency. Fillers of the former type are 4-head machines and work at a speed of 50-60 packs per min. depending on the actual soup mix being filled. The packets used are made of a double layer of aluminium foil with a layer of paper between, and are coated with a layer of heat-sealing material. They are supplied mainly by the Metal Box Co. The packets are fed to the filling nozzles by hand, and then placed on a conveyor belt which carries them to the heat-sealer, which works on a roller principle. As they emerge from the sealer the packets are packed in lots of 12 in display cartons, which are finally packed in boxes of 2 for dispatch.

The "auger" filler, which is used, for example, on Chicken Noodle Soup, extrudes the paste through the nozzle of an auger, and at the same time delivers a shot of noodles from a simple volumetric filler. Packets are again fed by hand, and the filling rate in this case is 65 packets per min. Subsequent operations are similar to those described for other soups.

The packets are filled to various weights, depending on the soup formula and this weight is held within a close tolerance.

They are check-weighed at regular intervals and if any significant variation outside the limit of tolerance is detected the fillers are stopped and adjustments are made to correct the particular machine which is at fault. The small degree of tolerance allowed was not easy to achieve, and the filling machines have been custom-built for Batchelors according to their own specifications.

The accumulation of dust also presents problems in the filling department when dried materials of this nature are handled, and in this case preventive measures have been directed especially towards the ceiling, which is clad throughout with aluminium plate. This eliminates all crevices, etc., which might harbour dust, and greatly facilitates the task of cleaning the department. The ceiling is shown clearly in our illustration of the filling department.

SOME SUPPLIERS OF EQUIPMENT

Dryers: *L. A. Mitchell, Limited; Messrs. Briggs.*
Mixers: *Hobart Manufacturing Co., Ltd.; Morton Machine Co., Ltd.*
Granulator: *Manesty Machines, Ltd.*
Fillers: *Batchelors Foods, Limited.*
Batch control system: *Elliott Bros. (London), Ltd.*
Weighing machines: *Berkel, Limited.*
Laminated foil packets: *The Metal Box Co., Ltd.*

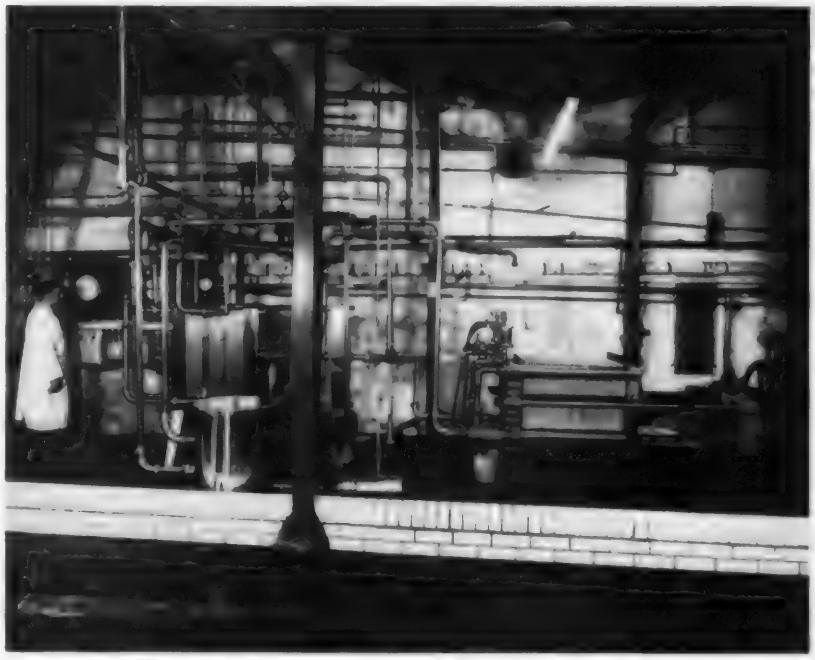
Problems and Perspectives in Malt Vinegar Brewing

By John White,* D.Sc., F.R.I.C., M.I.Biol.

High quality malt vinegar cannot be produced by a haphazard process. It demands considerable care in the selection of raw materials and in the control of the oxidative and alcoholic fermentations, and an adequate period of maturation must be allowed. In this article, Dr. White discusses some of the factors over which control must be exercised, and some of the problems which have still to be overcome.

IN Great Britain malt vinegar is prepared by the bacterial oxidation of alcohol which has been produced by fermentation by yeast of a sugary wort (which, in turn, has been obtained from a mash of malted barley with or without the addition of further sources of starch, *e.g.* unmalted barley). The addition to the malt mash of a proportion of fermentable sugar (*e.g.* sucrose or invert sugar) is permissible.

The first stage of manufacture consists of mashing the brewing materials together in such a way that any starch present is converted into fermentable matter by the amylolytic group of enzymes present in the malt. Yeast is added and conversion of sugar to alcohol proceeds to completion. The fermented wort is then stored for a variable period of time. Some brewers extract the yeast before storage, others allow the yeast to sediment out during storage. After the required period of storage has been given, the wort is acetified, the alcohol in the wort being oxidised to acetic acid. The crude vinegar so obtained is then stored for a period varying from a few days in the case of the manufacturers whose policy is to sell vinegar regardless of quality, up to several months, which is a sufficient "maturing" period to produce a high grade matured vinegar of fine character and of good colloidal stability. The vinegar is then diluted with water to the requisite strength, colour (caramel) being added if required, filtered, and run into bottles or casks (with or without pasteurisation, which many brewers now regard as essential for good storage life).



Filtration and pasteurisation plant for vinegar manufacture.

Certain breweries add a small quantity of common salt to minimise breakdown of vinegar by micro-organisms upon storage.

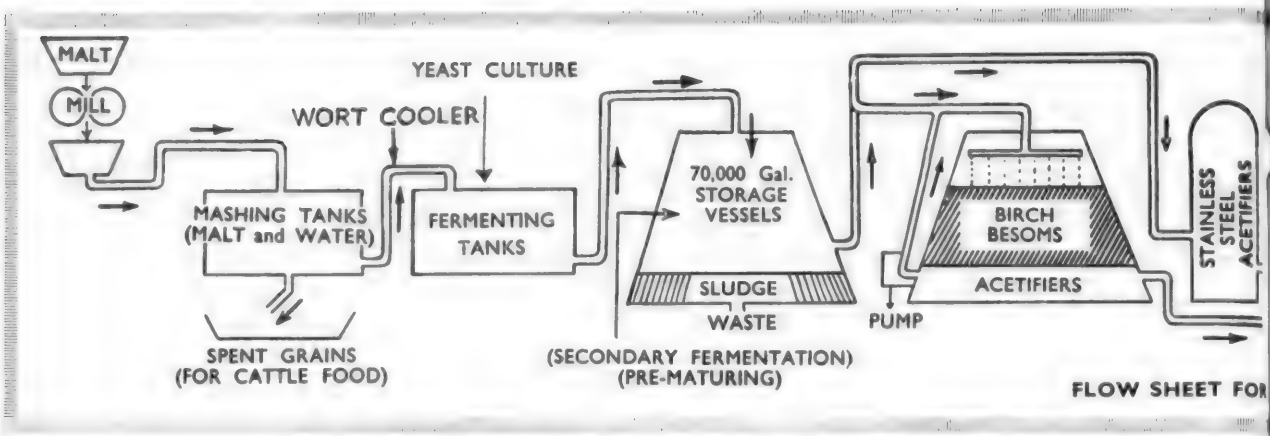
Problems and perspectives

The scientific and technical problems confronting the brewer of malt vinegars are many and varied, and the purpose of the present paper is to touch briefly upon certain of these problems, outlining what conclusions have been drawn and suggesting the many fields which are still left in which progress through research is necessary before we are able to state that we fully understand all the phases of this fascinating blend of art and science.

Materials

Barley malt. This is, of course, the prime ingredient. It must have a sufficiently high diastatic activity to be able to convert all the starch present in the malt and the starchy brewing adjuncts (*e.g.* any raw barley which is used) into non-starchy materials. Normally a highly diastatic malt is used, possessing a diastatic activity of upwards of 70° Lintner. The normal diastatic activity (°L), of course, gives a measure of the *total* combined activity of the α- and β-amylase enzyme systems. It is gradually becoming more and more evident

* *Fardon's Vinegar Co., Ltd., Birmingham.*



Flowsheet for malt vinegar production, showing the essential stages.

that a knowledge of the relative amounts of α- and β-amylases may be of more interest than the *total* Lintner value. Brewing malts may vary enormously in their relative contents of these two enzymes. We have met a malt with a total diastatic activity (α- and β-) of 118° with α- =11° (or 10% of the whole), whereas another malt of total α- + β-activity of 89° had α- of 2° (or only 2·2% of the whole). Such differences in relative enzyme activity may give rise to considerable variations in mash tun yield and final vinegar analysis.

Prof. R. H. Hopkins[1,2] has recently reviewed the fate of α- and β-amylases in brewing and has demonstrated that these enzymes are adsorbed upon the yeast cell as fermentation proceeds —assuming that the enzymes are present in the wort.

Figures which we have obtained show that a mash having an original α-amylase activity equivalent to 25° L possessed only less than 1° L of such activity at the end of three days' fermentation, whilst corresponding figures for β-amylase activity fell from 71° L at the start to 3° at the finish.

In addition to α- and β-amylases the content of the *limit dextrinase*[1] enzyme system is of great interest, controlling as it does the final particle size of dextrin left in the fermented wort. Much more information is required upon this newly investigated enzyme system.

Barley. As with barley malt much remains to be done before our knowledge of the chemical and biological composition of barley is even reasonably comprehensive. Barley is used primarily as source of starch in vinegar brewing but obviously any reasonable quantity of barley added to a malt mash is a source of the raw protein and other substances which are recognised as causing troubles in beer brewing—particularly in respect to formation of non-biological hazes, etc. (see later in this paper). The work of Preece and his colleagues at Edinburgh has given us much information upon the nature of some of the gums and hemicelluloses present to the extent of only a few per cent. in cereal grains—the influence of such constituents upon the brewing process and composition and colloidal properties of the final vinegar must at the moment be a matter of speculation. It is certain that the protein and other constituents of raw barley can give rise to much trouble in the matter of protein hazes when combined in complexes with metals (notably copper, iron and tin) and other groupings (*e.g.* tannins, phosphates, etc.) as will be discussed later.

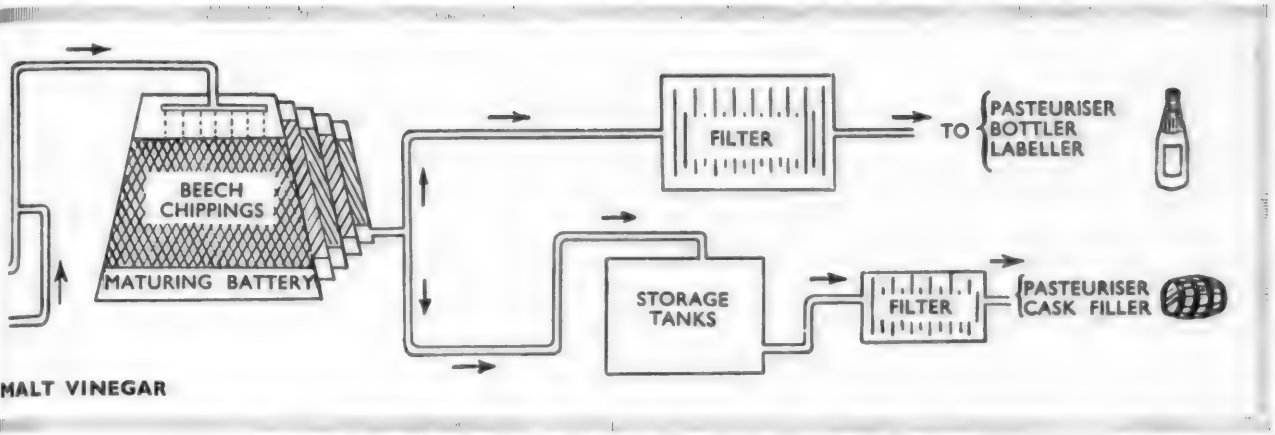
Sugars may be added to the grist in Great Britain and their use cheapens the final vinegar, besides acting to some degree as a diluent of the desirable background contributed by the non-fermentable fraction of the malt ingredients of the brew.

Mashing and brewing methods

There is a wide diversity of methods in use in the British vinegar industry, even wider than in the beer brewing trade. To discuss and speculate upon such methods would be quite beyond the scope of this paper. We might, however, confine our few remarks to the following topics.

(*a*) *Relative Content of Malt and Barley in the Mash*. Obviously this is partially an economic matter involving questions of relative cost of barley and malt in addition to availability of barley in the period between harvests. English practice varies enormously. Some brewers employ 100% malt, others use up to 60% or even more of barley in their grist.

(*b*) *Brewing Procedure—Breakdown of Proteins and Starches in the Mash*. When using high percentages of barley it is obvious that care must be taken to allow the malt and barley enzymes in the grain mixture sufficient time under the correct mashing conditions to break down the raw barley proteins sufficiently to prevent protein precipitation troubles at later stages in the process—particularly in the final vinegar—in addition to allowing complete modification of the barley starch to give maximum fermentable extract. What is the effect of increasing the proportion of barley upon the fermentability of the extract? It may be imagined that the more malt that is present the greater would be the degree of fermentation of the extract. Our own findings are paradoxical, however, in this respect and we have often found that a proportion



Alternative lines for bottling and cask-filling operations are indicated.

of barley gives greater fermentability to an extract. We found, for example, that a mash prepared from 100% malt attenuated to an average of 2·5 brewers' lb. per barrel, whereas using a mash consisting of about 50% barley and 50% of malt the mash attenuated to less than 1·0 brewers' lb. per barrel. No explanation has yet been advanced for this phenomenon.

(*c*) *pH of Mash*. Obviously all the basis of protein and starch conversion in the mash is influenced by the mashing *p*H. English practice tends to allow plenty of time for proteolysis to follow its complete course at relatively low temperature (say 100-110°F.); (37-43°C.) before the temperature is allowed to rise for the conversion of the starch and, thus, the maximum degree of amino acid production by proteolysis is encouraged, which has the virtue of assisting the yeast nutrition in the alcoholic fermentation. After starch conversion many English makers will have a natural *p*H of 4·8-5·1 and this will be a sufficiently low *p*H for many brewers to add their yeast.

(*d*) *Use of Acids in the Mash*. Natural acidity is not sufficient for some malt vinegar brewers, some of whom add lactic or even sulphuric or phosphoric acids to lower the *p*H quickly to discourage growth of infecting bacteria during the alcoholic fermentation. Use of the inorganic acids, however, is dangerous practice, for these acids considerably reduce the natural alkalinity of the ash of the final vinegar and an acid or only faintly alkaline ash is a good indication to the public analyst of the fondness of the vinegar brewer for the addition of such mineral acids, which practice is illegal!

(*e*) *Sterilisation of Mash*. Too much infection in the mash may lead to loss of alcohol by interference with yeast function (for example, the yeast can be flocculated by too high a content of bacteria of some groups, particularly certain Lactobacteria, causing insufficient attenuation, precipitating the yeast from the wort). Every effort must, therefore, be made to reduce bacteriological infection in the brewing operation to a minimum.

(*f*) *Yeast Employed*. What influence does the nature of the yeast employed in the alcoholic fermentation exert upon the subsequent manufacturing process and upon the composition of the finished vinegar?

The *attenuative* capacity of the yeast is perhaps its most important single property. A yeast having high attenuative power produces maximum alcohol yield and ferments the maximum amount of carbohydrate from the wort. Conversely, a yeast of poor attenuation produces less alcohol and may leave a large amount of carbohydrate (dextrinous) material in the fermented medium. As examples it may be stated that a standard British wort left 3·5% of carbohydrate material at the end of a fermentation using a poorly attenuating yeast, whereas this figure was reduced to 1·2% of carbohydrate by the use of a yeast culture possessing a highly organised dextrin-splitting enzyme system. When these worts were acetified *directly* without a period of secondary fermentation, the resulting vinegars contained substantially comparable amounts of carbohydrate to that in the worts from which they were prepared.

When subjected to a complete secondary fermentation the poorly attenuated wort passed through a most vigorous phase of bacterial decomposition in which the residual carbohydrate was reduced from 3·5% to 1·1%, with production of 1·2% lactic acid, together with 0·8% of acetic acid and traces of other volatile acids and large quantities of carbon dioxide. The resulting wort upon acetification yielded a vinegar possessing only 0·9% of carbohydrate.

Other important factors include the fermentation capacity (*i.e.* fermentative rate) of the yeast and the possession by the yeast strains of either "flocculent" or "non-flocculent" tendencies. Obviously a non-flocculent yeast which stays suspended in the fermenting wort until attenuation is complete is preferable to a flocculating yeast which may settle before full attenuation, giving reduced alcohol yield together with much residual carbohydrate. Many brewing yeasts not prepared from pure cultures may be shown to consist of a number of yeast strains often including flocculating yeasts; such yeasts may never be completely relied upon to give constant attenuation in brewery practice. Use

of a pure culture of the most suitable yeast strain is an obvious necessity in the best practice.

Secondary wort storage fermentation

Wort undergoing storage after brewing and prior to acetification may undergo considerable change in nature and composition. Brewers who do not extract the yeast prior to storage allow the yeast to settle out in order to produce a moderately clear wort for acetification. In a long storage under this system the yeast tends to autolyse and part of the cell contents, including amino acids and mineral salts, are thereby incorporated into the ageing wort.

All worts undergoing storage rapidly develop a very mixed flora of micro-organisms and these may cause much change in the nature and composition of the wort. Some of the chief organisms found therein produce lactic acid from any residual carbohydrate and after some weeks' fermentation most of this fraction from the original grain is converted. Much carbon dioxide gas is produced and such conditions are useful in suppressing harmful wild yeast-like organisms of the Mycoderma, Monilia and Candida types which are oxidative in function and which, once established as a surface growth on a vat of fermenting wort, rapidly destroy the alcohol to carbon dioxide and water. Certain heterofermentative organisms often grow in the wort and these may form a mixture of lactic acid, together with a useful quantity of acetic acid, in the liquid. The wort-storage fermentation can enable significant production of acid from carbohydrate unassimilated by yeast in a poorly attenuated primary alcoholic fermentation. There seems little justification, however, for the wort storage process when using a wort which has been highly attenuated by yeast which has then been mechanically extracted and the clear wort so obtained could be oxidised directly to give a most satisfactory vinegar.

Acetification of wort

Whilst the use of the birch acetifier in the traditional "Quick Vinegar" process is still the basis of the vinegar industry in Great Britain there is no lack of interest in the more modern processes such as the deep-culture type fermenters. The chief topics involved here are probably largely of an economic nature—the appraisal of the advantages accruing from the modern systems contrasted against their very high capital costs.

Vats for storing and maturing malt vinegar.

Scientifically, the most striking advances in our published English literature have been made by Shimwell,[3,4] who has stated that he had successfully used a pure strain of *Acetobacter mesoxydans* in experimental acetifiers for the production of malt vinegars by both "quick" vinegar and "submerged aeration" processes. The results were superior to those given by a mixed flora as used in industrial acetifiers. Further recent work by Shimwell claims that a pure culture of the non-cellulose-forming organism *A. mesoxydans* yields both non-cellulosic and cellulosic mutants when grown respectively in "submerged aeration" and "quick vinegar acetifier" type environment.

Maturing of crude vinegar

Freshly acetified malt vinegar has a rough harsh flavour quite unacceptable to a connoisseur or even to the large mass of the population who enjoy the mellow flavour and characteristic bouquet of a "matured" vinegar. Maturing is carried out by storing the new vinegar for several months in contact with wood. The changes in the chemical composition of the vinegar upon maturing are, in contrast, often extremely slight.

Important changes in the colloidal nature of the vinegar upon storage are extremely obvious. A great degree of colloidal instability exists in freshly acetified vinegar as any brewer who bottles it is aware—heavy hazes consisting of protein, colouring matter, traces of inorganic substances (*e.g.* iron, copper, tin, silicon, etc.) may appear within a few weeks, often depending upon the oxidation-reduction balance existing in the vinegar. Storage under the correctly balanced conditions allows such sedimentation to take place in the maturing vats, a high degree of stability being produced in the stored vinegar due to the shedding of the unstable substances.

Clarification

Preliminary clarification is often accomplished in England as an integral part of the maturing process by gently passing the maturing vinegar down columns many feet deep of beech chippings or shavings. The solid particles and much of the colloidal matter in the vinegar are deposited on the beech wood. Other English brewers employ a preliminary filtration using Kieselguhr to obtain a reasonably bright vinegar. Some brewers then employ a final "polishing filtration" using filter sheets made of asbestos and cellulose which produce a vinegar of great brilliance.

Vinegar colouring

If colouring is necessary caramel colourings are added. The work of White and Munns[5,6] has demonstrated that commercial caramels may be classified according to the electrical nature of the colloidal colouring matter present and this may be of fundamental importance in choosing a caramel colouring for a particular vinegar. The colouring matter in many caramels was shown to behave in very similar fashion to a soluble protein and to obey the rules of colloidal behaviour investigated in Loeb's classical work. Many of the colouring substances possess well-defined iso-electric points at which they are electrically neutral —if the *p*H of the solution is raised above the iso-electric point the colours become negatively charged —at *p*H values below the iso-electric point they take an increasingly positive charge as the *p*H falls. It was shown that caramels contain varying types and amounts of colloidal colour particles of iso-electric point varying between approximately *p*H 3 and *p*H 7. Due consideration must be given, when adding a caramel, to the effect of the colloids which are present in the vinegar and this is dependent upon the precise *p*H of the vinegar. Caramels containing positively charged colloids will tend to coalesce with any negatively charged or even electrically neutral colloidal particles and, under certain conditions, a precipitate will be formed consisting of a complex of the original colloids, the coalescence having produced a particle size too great to stay in colloidal solution. The high content of unstable colloids in fresh un-matured vinegar is largely responsible for the precipitation, if bottled fresh, particularly with added caramel.

Most mature English malt vinegars behave satisfactorily when coloured with caramels having high iso-electric points (say at *p*H 5 or above).

Variations in brewing and maturing procedure, however, may call for a change in caramel type for optimal stability. Use of a low iso-electric point caramel (say at *p*H 3) may be fraught with great dangers, as this *p*H is so very close to the *p*H of malt vinegar. Depending upon brewing methods and materials and acid strength, English malt vinegars which are highly buffered with natural buffering materials normally vary in *p*H between about 2·7 to 3·1. As an illustration, suppose that a caramel colouring with iso-electric point of 3 is used with the two vinegars at the extremes of this *p*H range. With *p*H 2·7 vinegar the caramel colour would be positively charged and would stabilise positive vinegar colloids, whereas with *p*H 3·1 vinegar the caramel colour particles would be negative and would unstabilise the positively charged vinegar colloids.

Special precautions are taken in the selection of caramels for colouring of vinegar used in pickling of onions. Onion cells possess a strong electro-negative charge. If the vinegar solution possesses electropositive caramel colouring, adsorption takes place upon the onions which are rapidly stained dark brown. A caramel having an iso-electric point *below* the *p*H of the vinegar is, therefore, required if the onions are to be preserved unstained.

Flavour, bouquet and stability

All the factors discussed in this paper have a bearing upon the final organoleptic excellence and colloidal stability of the final vinegar. Assuming that the vinegar is bottled sterile so that growth of micro-organisms is precluded most malt vinegars begin to lose their optical clarity with age due to the onset of hazes of various kinds under various conditions. Bottled in *anaerobic* conditions, hazes showing gradual development may be due to slow precipitation of protein fractions and colour colloids, either alone or more generally in combination with traces of copper, tin, or silicon complexed with inorganic groups such as phosphate.

In *aerobic* conditions traces of iron rapidly form complex precipitates with phosphate and proteins and colour colloids; participation of traces of other organic substances such as phytic acids and tannins may also be possible. To maintain good clarity over several months a malt vinegar must not contain more than about 2 p.p.m. of iron, 0·3 p.p.m. of copper, and tin must be absent—in addition, the protein and carbohydrate fractions present must be as stable as possible—obviously a function of all the many facets of the various stages of the brewing, storage and maturing processes.

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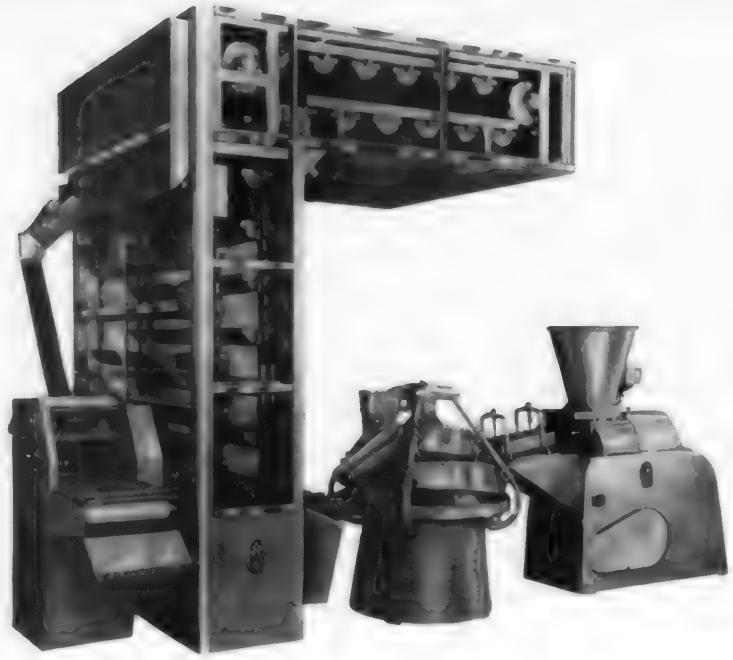
Sugar Technology

SIR OLIVER LYLE'S book* is by now well known in the sugar industry, and the appearance of a third revised and enlarged edition will be welcomed by many who can testify to the usefulness of its forerunners. This new edition contains four additional chapters, as well as over 50 new sections in the original chapters. Most of these additions have been suggested by the staff of Tate and Lyle, Limited, some 150 of whom have made suggestions for improvements.

The book as a whole is of interest to a much wider group of readers than those engaged primarily in the production and refining of sugar. The chapters on vacuum pans and evaporators, for instance, will be of a great interest to anyone dealing with the concentration of any liquid food product, whilst those on heat and steam and the production and use of electricity are of even wider general interest to the aspiring technologist.

The book is written in Sir Oliver's usual informal and highly individual style, and despite its length it remains readable throughout.

* *Technology for Sugar Refinery Workers*. By Oliver Lyle. 3rd Ed. Revised, rearranged and enlarged. 1957. Chapman and Hall, Ltd. Pp. 663. Illus. 70s. net.



EQUIPMENT for the MECHANISED BAKERY

COMPLETE installations and a comprehensive range of individual equipment for the manufacture of bread and all types of biscuits are provided by T. and T. Vicars, Ltd. An example of their large-scale installations is provided by the biscuit production line illustrated. The units are specially constructed to allow the easy maintenance of clean and sanitary conditions, and a considerable flexibility of output is attainable. Thus the equipment may include, as well as the standard cutting and embossing machine, sheeter, sugar-sprinkler, flour-duster, washover, wire-cut, rout, fig bar, fruit-biscuit and rotary-moulding attachments, according to choice. Scrap return equipment may be placed either centrally or at the side. The individual units are standardised in construction, and the easy change-over facilities that this provides permits their use in any single automatic production line.

Ovens suitable for every type of biscuit are also provided. These are normally of the steel band or wire web type in fully automatic lines, but tier ovens and tunnel-type plate ovens suitable for automatic production can also be supplied.

Cooling, transporting and stacking equipment for handling the cooked biscuits as they leave the ovens are also designed to give maximum versatility both in the handling of biscuits of different types and sizes and in the overcoming of space problems. Thus packing lines along-side the plant, in line with it, or on other floors can be equally well served.

Other complete installations provided by Vicars include automatic equipment for the production of Swiss rolls (also illustrated), wafer-producing equipment, and automatic installations for bread production. Various types of dough mixers and pneumatic flour-handling equipment can also be provided.

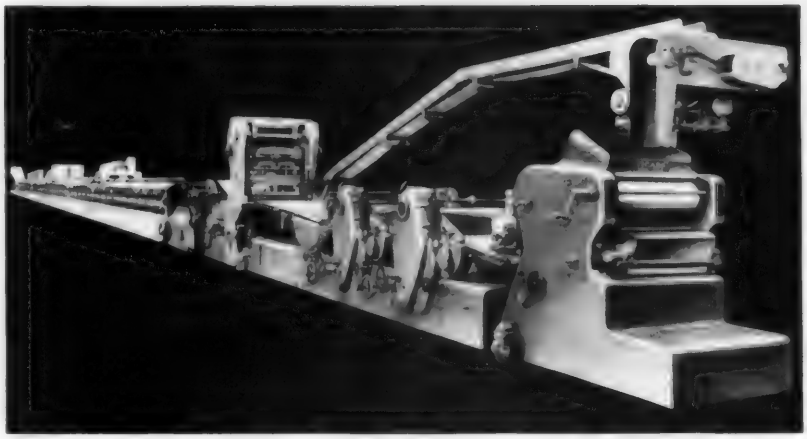
Bulk handling of flour

Equipment for the bulk handling and storage of flour is the speciality of Henry Simon, Ltd., who provide installations suitable for all sizes of operation. Initial cost of the installations is high, but savings effected are also very great, and it is estimated that capital expenditure can be regained in a comparatively short time. Savings are effected not only in labour costs, but also in costs of original flour and in flour losses during operation. Handling may be by mechanical means such as conveyors and elevators, but fully pneumatic systems are recommended wherever their use is feasible. Blending problems may arise for the small baker who wishes to employ bulk handling, but as more and more of the miller's customers go over to the purchase of flour in bulk he is able to blend flours from bulk storage at the mill to suit his customers' particular requirements. Thus blending problems for the smaller baker, far from being aggravated, may actually be eliminated as bulk handling increases. Schemes also exist for the metering of small supplies from bulk vehicles to portable containers in the bakery, to cater for the needs of the small baker. Storage bins may vary considerably in size and shape, and existing storage space can therefore often be utilised.

Other interesting equipment supplied by Henry Simon, Ltd., includes the *Junior* sifter, which has been designed to meet the need for a small, flexible, dust proof sifter for the screening and grading of finely granulated materials at an economic rate of throughput. The machine comprises 8 sieves totally enclosed in a metal case, which is suspended from a metal frame by canes. Rotary motion is imparted to the sieve case by a mechanism driven by a $\frac{1}{2}$-h.p. motor.

Larger units, suitable for higher production rates, are also manufactured.

Above: **Fully automatic bread-making plant made by the John Pelkman Engineering Co., Ltd.**



Plant for the fully automatic production of biscuits, made by T. and T. Vicars, Ltd.

Bread-making plant

Automatic plant for the production of bread is now made by the Kneeda Manufacturing Co., Ltd. This incorporates a number of well-known machines, which are linked up to form a straight through plant. The machines comprise a *Pedigree* divider, a *Fyna* rounder, a *Fyna* intermediate prover, and a *Major* moulder. These machines are capable of producing plain or variety bread at the rate of 3 to 6 sacks per hr., and in conjunction with a *Fyna* final prover and a travelling oven of the double lap, single lap, or tunnel type, they form a complete bread-producing and baking plant. Units are available separately, and the plant can be built up in stages as required.

Ovens of the type described are produced by the same firm, who also specialise in the production of reel ovens. They are able to offer over 100 different models of this type of oven, with capacities ranging from 5 to 72 confectionery baking sheets. These ovens are extremely versatile in performance, and are said to produce crusty bread, Vienna bread, tin bread, rolls, confectionery, pies and biscuits of a uniformly high standard. Low initial cost and economy of operation are also claimed for these ovens.

Nowadays, bread production rarely ends with the baked loaf, as wrapped and sliced bread is commanding increasing sales. Machinery for slicing and wrapping bread is also produced by the Kneeda company. Their *Fyna* range includes combined slicers and wrappers with power-assisted or gravity feeds, having capacities of 200 and 500 loaves per hr. respectively, and fully-automatic wrappers with capacities of up to 1,000 loaves per hr.

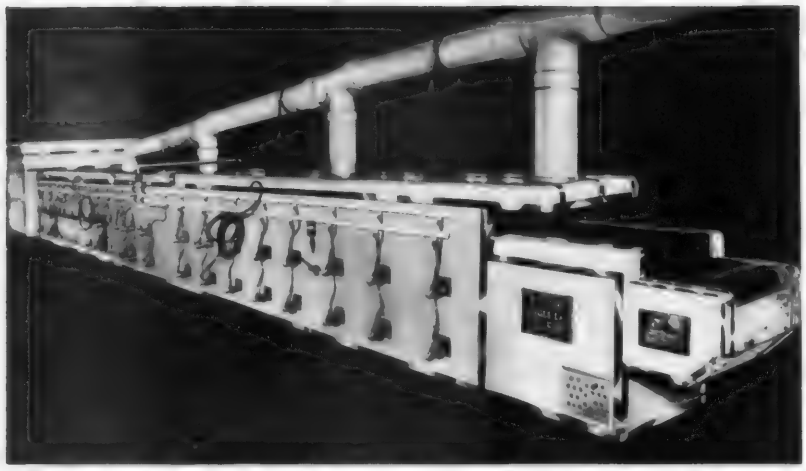
An automatic installation for the production of bread, consisting of a suction dough divider, a conical rounder, an automatic first prover and a final moulder, is also made by the John Pelkman Engineering Co. Again, the units are available singly or as a complete plant. Provers are custom built to meet individual production requirements, with holding capacities of from 100 to 500 dough pieces, and proving times are adjustable. Output capacities range from 2 to 10 sacks per hr., and the unit may be linked to drawplate, peel, rotary or travelling ovens.

Loaf moulders

Machinery for loaf moulding is produced by Sorensen Bakery Equipment, Ltd. Their *S.B.E. 4 Piece and Twist* moulder will handle all types of dough, and is said to be particularly suitable for forming loaves of protein-enriched bread. The machine is designed to mould dough pieces from 2 oz. to 4 lb., and standard fittings include an 8 in. shaper for tin loaves and a 16 in. shaper for 4 piece loaves. Alternative sizes of shaper are available to suit specific requirements. The machine is available if required for continuous plant operation at a speed of 12 sacks per hr., or 48 dough pieces per min. All feeding and sheeting rollers are P.T.F.E. covered, and considerations of hygiene have been observed throughout in the construction of the machine.

The S.P.E. *Cross Grain* moulder is another model made by the same firm. Their products also include the *Cream-Master*, a stain-

Plant by T. and T. Vicars, Ltd., for the continuous production of Swiss rolls.



A 45-ft. single lap oven designed for the production of starch-reduced rolls, made by the Kneeda Manufacturing Co., Ltd.

less steel cream-whipping machine, and the *Choco-Master* chocolate enrober. The latter machine is constructed throughout of stainless steel, and its compact form has been designed with the smaller user especially in mind. It will enrobe a wide range of cakes and other confectionery goods.

Automatic weight control

A machine for automatically controlling the weight of dough pieces is now being marketed by Woods Automatics, Ltd. The machine consists of 2 units, the first of which comprises a Beranger-type counter machine which has been so modified as to intercept, receive, weigh and discharge each piece of dough as it comes from the divider, and before its passage to the moulding machine. The result of the weighing is conveyed by electrical impulses to a second unit, which is able to control the divider itself, regulating the amount of dough measured in subsequent operations. Small variations in the weight of dough measured by the divider are therefore immediately corrected. If pieces excessively over- or underweight are delivered, a warning mechanism is activated, and long runs of material of incorrect weight are therefore prevented. The fine control which can be achieved by this machine is said to increase yields considerably, whilst at the same time protecting the manufacturer against the sale of underweight goods.

Roll and bun dividers

Machines for the automatic dividing and moulding of rolls and buns are made by the John Pelkman Engineering Co. Their *Hydraulik* divider-moulder is hydraulically operated, as its name implies, and is capable of producing up to 8,000 rolls or buns per hr. The machine is manually fed and unloaded, but the actual operations are fully automatic. Four models, suitable for producing pieces of different weight ranges, are available. Other models, with different capacities, are also made.

A roll divider and rounder is also made by the Kneeda Manufacturing Co., Ltd. Their *Fyna* model produces 36 pieces at one time, and will produce 6,000 pieces per hr. Sizes from $\frac{3}{4}$ oz. to $2\frac{1}{2}$ oz. can be produced. The machine incorporates a $\frac{3}{4}$-h.p. motor, and can be operated from a power point or lamp holder.

Moulders and dividers for paste and buns are also supplied by John Hunt (Bolton) Ltd.

Rotary biscuit moulders

The John Pelkman Engineering Co. also produce a number of rotary biscuit moulding machines. These are built in a range of sizes to suit different sizes of operation, 18 models being available in all. Special designs can be engraved to suit individual requirements, and the moulding rollers are interchangeable. The machines can also be used for preparing lids for mince and certain other pies, and for measuring paste for the linings of jam tarts, custards, etc. The larger models can be fitted with attachments for washing the biscuits with water, egg, etc., or for sprinkling them with almonds or sugar.

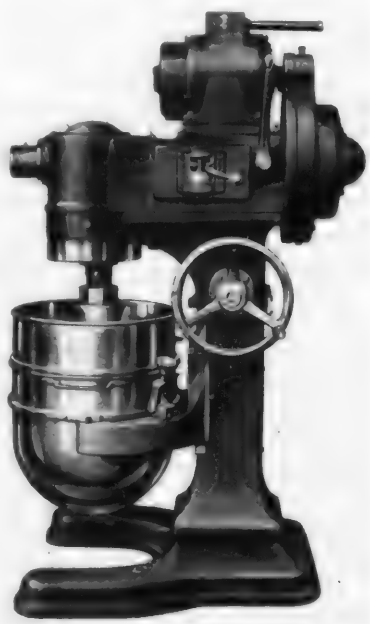
Cake mixers

A range of mixers for cake batters and similar substances, one of which is illustrated, is made by John Hunt (Bolton) Ltd. The illustration shows the *Duratax* mixer, a machine with an 80-qt. capacity, and the largest in the range. Other equipment made by the same firm includes the *Little Champion* machine for forming open and lidded shells of pastry, and a number of hand and power driven pastry rollers.

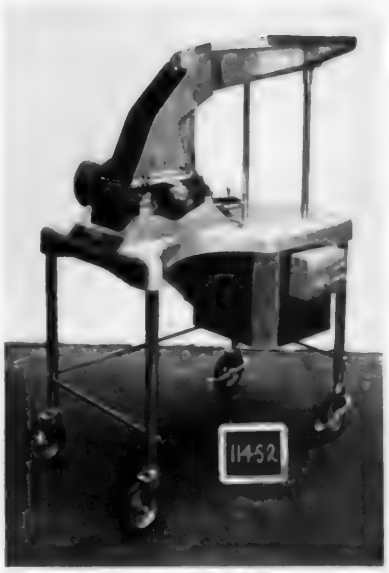
Cake mixers of various types and sizes are also supplied by the Kneeda Manufacturing Co., Ltd., and the Hobart Manufacturing Co., Ltd.

Cake slicers

The production of sponge sandwiches involves the cutting of a large number of cakes for insertion of the filling material, and a machine for performing this oper-



The Duratax cake mixer, the largest model in the range of mixers made by John Hunt (Bolton) Ltd.



One of the range of comminuters made by Apex Construction, Ltd.

ation is built by J. Crollie and Son, Ltd. Their *Auto-Slitta* model will handle up to 3,000 cakes per hr., the two halves being delivered ready for spreading. The cakes are placed on a moving web belt, which passes them through an endless band knife running over a 14 in. pulley. The machine is adequately guarded, but all parts are readily accessible for cleaning purposes.

The *Multi-Secta* slab cake slicer, which is made by the same firm, has been designed to cut portions of slab cake ready for packaging and retail sale. It will handle all types of cake from plain Madeira to heavy fruit slabs, and has a capacity of between 500 and 600 1-lb. pieces per hr. All sizes of cake up to 22 in. long by 8 in. wide can be handled, and the thickness of cut can be adjusted by stages of $\frac{1}{8}$ in.

Swiss roll wrapping machine

A machine for the automatic wrapping of Swiss rolls is made by Bramigk and Co., Ltd. The rolls are wrapped in cellulose film, complete tear strip and photo-electric registration for panel printing. The first stage of the machine consists of an infeed, which has a number of compartments, each having 2 vertical carrier plates cut out half-moon shape in which the operator places the rolls. There are no side guides, either at this stage or in the wrapping mechanism, and smearing of jam or cream fillings is therefore avoided.

The machine is essentially a one-size unit, and has been designed on the basis of the standard size rolls current in England. It is adaptable, however, for use with other sizes. Speed of operation is infinitely variable between 30 and 60 rolls per min.

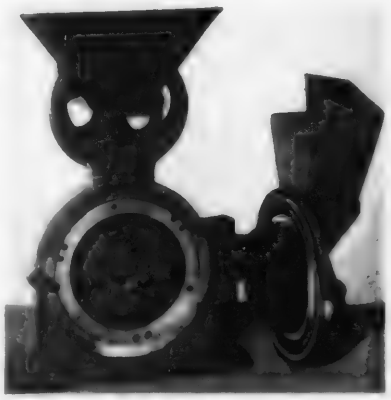
Peel cutting machines

A number of cutting machines with applications in the bakery trade are manufactured by Brierley, Collier and Hartley, Ltd. These include plunger type machines and the *Speedy* peel cutter, which is also widely used for the cutting of citrus skins for the preparation of marmalade. The machines can be variously used for the cutting of syruped and candied peels, citron, figs, angelica, ginger, and a variety of nuts. The same firm also manufacture a chocolate shaving machine, designed to shave block chocolate or other materials of a similar consistency into thin slices, thus considerably facilitating subsequent melting operations.

Pulverisers

Materials such as spices and icing sugar often require to be finely ground, and the *Pulmac* high-speed pulveriser, made by Follsain-Wycliffe Foundries, Ltd., has been supplied to many bakers and confectionery manufacturers. These mills are supplied in 4 sizes, ranging from a laboratory model, suitable for dealing with samples and for small-scale production operations, to a model with a capacity of 3 to 4 tons per hr. They produce no external dust, and they can be quickly cleaned after use. Each mill is equipped with a screen to remove oversized particles from the final product, and screen perforations may be as small as 0·1 mm.

Comminuting mills with several applications in the bakery trade are also manufactured by Apex Construction, Ltd. These are available in 5 different sizes from $1\frac{1}{2}$ to 30 h.p., with throughput capacities from 100 to 10,000 lb.



The Pulmac high-speed pulveriser, a model made by Follsain-Wycliffe Foundries, Ltd.

per hr. In all, nearly 80 different models are available. The mills have been used for the homogenisation of dried fruits and the preparation of fruit fillings for flans, tarts and sandwiches, for the production of bread crumbs in controlled sizes and the recovery of waste biscuits and confectionery products, and for the final intimate mixing of roughly mixed dry materials.

The machines are built in the form of hammer mills, and have a dual-action mechanism which allows either side of the double-edged rotor blades to be used by the simple reversing of the direction of the motor. The standard machines are normally arranged for three-speed operation, and 10 different types of blade, including knife-edged blades for slicing fruit, can be fitted. These features give the machine considerable versatility, and changes from one type of operation to another are said to be very simply effected. Screens are available from $1\frac{1}{2}$ to 300 mesh.

Grinding mills are also supplied by Pulverizing Machinery, Ltd. Their *Mikro-Pulverizer* is available in 6 sizes, and is suitable for grinding wet or dry materials. Grinding temperatures are said to be kept to a minimum, and the machines are therefore suitable for handling heat-sensitive materials.

Dust control

The *Mikro-Pulsaire* dust collector is also manufactured by the same firm. This is a simplified

(*Concluded on page* 108)

RAW MATERIALS HANDLING

Recent Trends in Bakeries and Biscuit Plants

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In many large bakeries and biscuit plants throughout the country, and even in some smaller establishments, bulk handling of raw materials is permitting manufacturers to cut handling costs, reduce wastage, and generally streamline their processes. This article examines some of the problems associated with bulk handling and the advantages which can accrue from this technique.

IN bread bakeries and biscuit factories great attention has been paid in the past to machinery for the actual manufacturing process, but it is only recently that raw ingredients handling has been given much thought.

During the last five years, however, many raw ingredient handling plants have been installed, some complicated, some simple, but all having the same object: to reduce the labour force required in the warehouse. These plants have usually been designed to handle the ingredients in bulk and there is no doubt that this trend will continue.

Fig. 1. Bulk flour wagons discharging their loads.

Advantages of bulk handling

Some of the reasons for bulk handling are obvious and some less obvious. Labour saving in the bakery is important, but equally important is the packing labour saved on the supplier's premises, since this enables him to reduce the price of his product. Transport charges are often reduced, for although bulk vehicles are usually more expensive than normal flat lorries, vastly improved turnround time and better utilisation more than offset the difference in initial capital cost. Container costs are eliminated and the residue of material normally left in these containers is saved. Materials delivered in bulk are usually cleaner than those received from small packages, and the risk of contamination from pieces of the container, or by other foreign bodies during opening, no longer exists. This means that less elaborate cleaning plant is required in the factory and that the number of complaints from the public concerning foreign matter in the final product is reduced.

For reasons of economy or quality it is often necessary to blend certain similar ingredients before baking. This can be done simply and accurately when material is stored in bulk, whereas to produce the same result from package ingredients is difficult and labour consuming. In the same way, the correct batch sizes can easily be drawn from the bulk store without the inconvenience of sub-dividing the contents of small containers. With certain precautions, which will be described later, the bulk store can be considered as a limitless reservoir, and if all the ingredients are bulked it is possible to eliminate mistakes due to human neglect or misjudgment by interlocking all the systems feeding from the bulk store to the final process. This can, if required, be achieved by a number of virtually foolproof systems.

A further advantage of bulk ingredient handling, which cannot be calculated in terms of pounds, shillings and pence, is the general improvement of plant cleanliness. Whilst a plant in which the materials are used from small containers can be kept perfectly clean, it is obviously much easier to achieve this result when all the materials are kept and handled in a totally enclosed system.

Trends in bulk handling

There are three phases in the trend towards bulk handling of ingredients, namely:

1. Bulk transport and intake.
2. Storage of materials in bulk.
3. Automatic pre-processing and distribution.

1. Bulk transport and intake. At the moment, flour, fats and oils, granulated sugar, glucose, cane syrup, liquid milk, chocolate, and salt are transported in bulk and unloaded by equipment either mounted on the transporter or based at the bakery.

Supplies of these materials in bulk are at the moment delivered to relatively few factories, but the basis of a nation-wide transport

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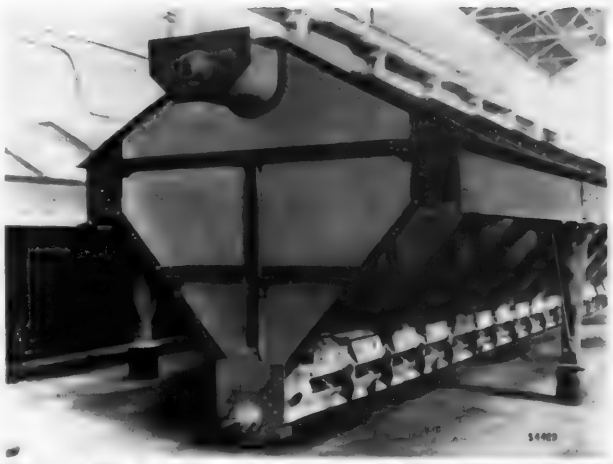

Fig. 2. (*Left*) **A horizontal sugar storage bin. Fig. 3.** (*Right*) **Horizontal flour storage bins in the biscuit factory of McVitie and Price, Ltd.**

fleet has already been formed and the next few years will undoubtedly see a considerable increase in bulk tonnages. As an example of what has taken place so far, it is interesting to note that bulk flour deliveries, which were virtually nil in the U.K. five years ago, are now estimated at about 200,000 tons per annum.

So far there has been a tendency, in this country, towards bulk transport by means of road vehicles, probably due to the facts that the hauls are comparatively short, and that suppliers or their technical advisers (rather than the hauliers) have produced the ideas for bulk transporters. There is also a general leaning towards road transport throughout industry, and there is no reason to suppose that rail or water carriage will play an important part in the immediate future.

Vehicles for transporting different ingredients vary considerably in design since the characteristics of the materials to be handled also vary considerably. Liquids and semi-liquids are normally carried in orthodox tankers, and while in some cases special constructional materials are required, and in others insulation or even heating of the load is called for, the technical problems are not great. Intake arrangements are equally simple and a pipeline and pump to transport the liquids from the tanker to the store or process is all that is required.

Some of the powdered ingredients require more complicated vehicles, especially if the flow characteristics of the material are poor. Flour, for example, is a difficult material to flow and the bulk flour vehicles at present on the road are the result of considerable experimental work in the past. The two problems encountered in discharging a powder of this nature are those of emptying the material from the container, and elevating it to the bakery. Tipping or fluidisation are normally used to empty the container, and a pneumatic conveyor is invariably employed to feed the material to the plant. These details are merely given to indicate why bulk deliveries of flour lagged behind some of the "easier" materials, but in fact, now that efficient flour vehicles have been developed, there is little doubt that they will be used increasingly.

Simplicity and speed of unloading are important factors of any bulk vehicle and any machine which does not have these characteristics will be unacceptable in the future. Fig. 1 shows flour vehicles discharging their loads through single, small-bore pipelines, using discharge equipment built on to their chassis. This type of machine, carrying a large undivided load, will probably set the pattern for future bulk transport in this country.

The problem of acceptance weights for bulk loads has no easy solution, but the difference between gross and tare weights, taken either on the consumer's or a public weighbridge, seems to be the most acceptable system at the moment.

2. Storage of materials in bulk. Nearly all the bakeries and biscuit factories at present in existence are equipped with conventional warehouse buildings for storing raw ingredients in sacks, containers, or drums, and some are even being built to-day with this type of storage space. For this reason it has, in the past, and will in the immediate future, be necessary to design bulk storage containers which can be housed in these existing buildings.

Conventional warehouses are invariably made up of low rooms where piles of containers are within the reach of a man or, in more recent designs, within the reach of a fork-lift truck. Such rooms are really unsuited to storage in bulk, particularly for the dry pulverised materials which are ideally stored in high, narrow containers. However, given sufficient thought, schemes which show an overall saving when comparing plant versus plant, plus cost of new ideal buildings, plus demolition of existing buildings, can be evolved.

The illustrations in Figs. 2 and 3 show bulk storage containers for flour and granulated sugar which have been designed for use in existing sack stores. The flour bin is virtually flat bottomed and makes use of fluidisation and mechanical means to reclaim the

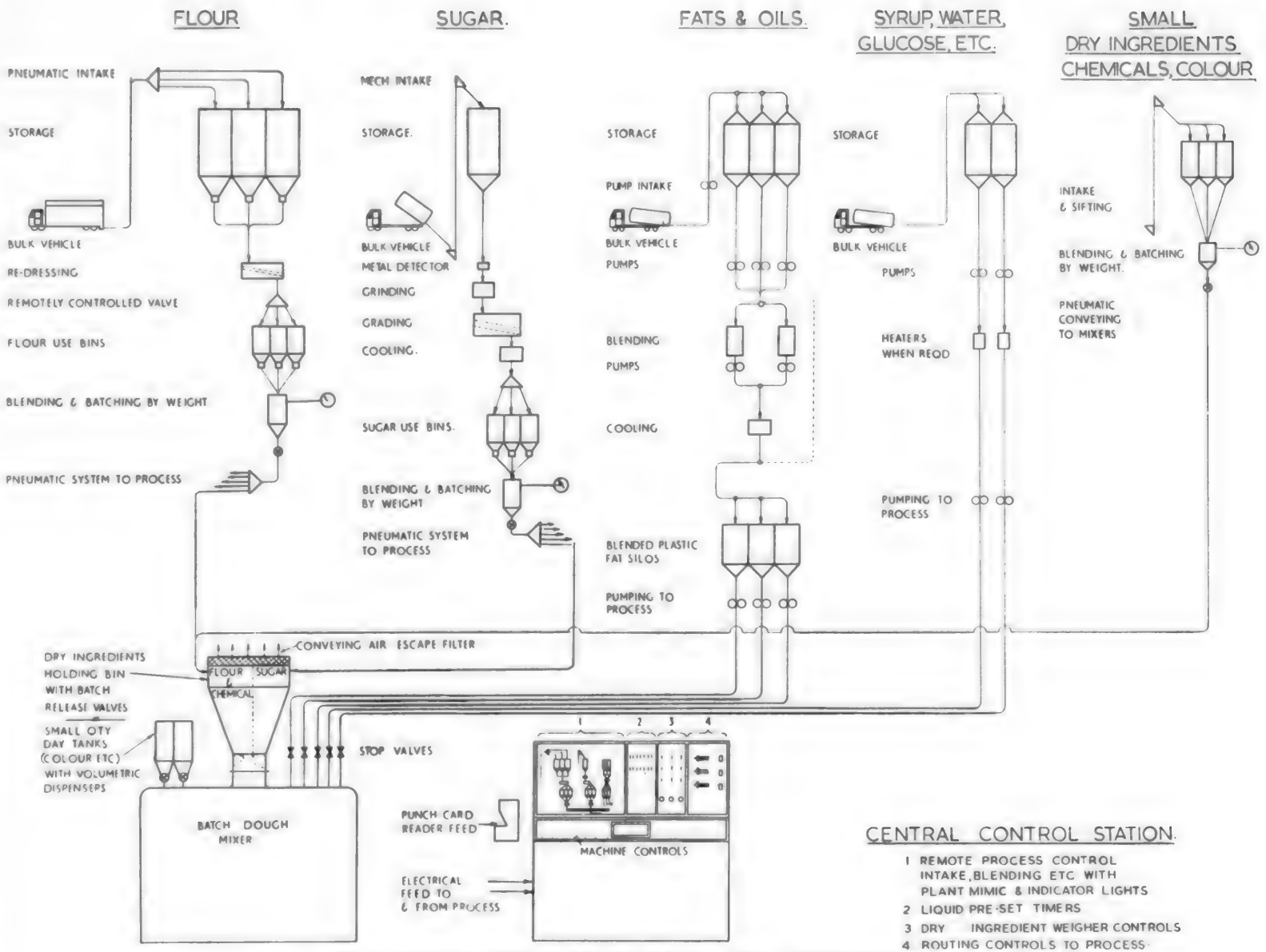

Fig. 4. Materials handling plant for biscuit factory using conventional mixers.

flour, pneumatic loading being used to effect complete filling. The sugar bin is hoppered to make use of the material's good flow characteristics when dry, filling and reclamation being effected by means of screw conveyors. The containers are insulated to prevent sudden changes in outside temperature affecting the rather delicate distribution of moisture in the sugar. These examples show what can be done to design containers for use in existing warehouses, and if the need arises there is no doubt that other materials can be dealt with in a similar manner.

For entirely new factories it would seem desirable to build a special bulk storage silo on "skyscraper" lines to accommodate all raw ingredients. This building could well be built as a solid monolith in reinforced concrete, with cells for storage of the dry materials forming an integral part of the structure. The liquids, together with the pre-processing equipment for cleaning, blending, etc., would be contained in a working house adjoining the silo block which would be of a similar height to obtain gravity falls between the various stages of the process.

The writer knows of no factory in this country where an integrated storage system of this type is in full operation, but it seems logical to suppose that this will be the basis for planning new units in the future.

Stock-keeping usually presents some problems to manufacturers when the change from small containers to bulk storage is made, and at the moment no foolproof system is available for accurately indicating stocks of powdered ingredients at an economical price. Rapid advances are at present being made in electrical and electronic weighing devices and level indicators, however, and it seems likely that these problems will be completely solved within the next few years. Even if it is not found possible to indicate accurately the contents of storage containers, there is no reason why an automatic system for recording incoming and outgoing batches should not be adopted and why it should not be made absolutely reliable.

The level of bulk ingredient stocks in the future is difficult to foresee. In the past, manufacturers have held widely varying stocks of ingredients which have, to some extent, been dependent upon the space available, liability of the market to fluctuations, desirability of "ageing" products during storage, and for various other domestic or local reasons. Capital outlay is invariably greater for bulk storage than for conventional warehouses, and the decisions regarding capacity are to some extent irrevocable. These two facts are, of course, incompatible, and while the manufacturer may, on the one hand, wish to restrict his capital outlay, he will certainly not wish to leave himself in the position where he may run out of one commodity completely. It is still too early to say what will be the optimum holding of any commodity in bulk, but it is almost certain that the figure will be considerably less than was commonly considered necessary five years ago.

3. Automatic pre-processing and distribution. Given bulk storage, the possibilites of centralised push-button control, automatic proportioning, and mechanised distribution of ingredients are endless.

In large plants it is logical to control the pre-processing (which usually comprises a number of fairly simple operations) and distribution of ingredients at one point and make one man responsible for the complete operation. Electrical control systems are now well advanced and reliable, and while it would be foolish to install any plant which did not incorporate facilities for local control, one could normally expect the plant to operate as designed without any trouble.

Some of the ingredients used in the baking process, notably flour, are prone to infestation, and for that reason conventional screw, bucket or drag-link conveyors are unacceptable. Recent developments in self-cleaning pneumatic conveyors with stable characteristics have, however, made mechanised distribution of dry ingredients possible, and their uses are only now being realised within the industry. The self-cleaning properties of these conveyors are so marked that centralised weighing of ingredients for batch mixing is now possible and is, in fact, employed by some of the leading biscuit manufacturers.

The advantages of centralised weighing of dry ingredients are further enhanced by recently developed systems by which the weighing machines and the bulk containers feeding them may be remotely and automatically controlled. The formula can, if required, be fed into the system by means of a punched card which can dispatch a batch of ingredients to any given mixing machine at a pre-determined time.

Liquids can be dealt with in the same manner, although due to their simple flow characteristics and uniform bulk density batching by weight is seldom required and volumetric means can be employed.

Fig. 4 is a diagram of an ideal biscuit factory handling plant where all the main ingredients are stored in bulk and the trace ingredients kept in day-use bins. This flow sheet is purely imaginary since there is, at the moment, no factory in existence where all the raw materials are handled in the manner suggested.

It is assumed that conventional batch mixers will be used in this plant and arrangements are therefore made for distributing the materials to the various points in pre-measured batches.

The various sections of this plant would operate as follows:

Flour intake would be by pneumatic conveyor to main storage silos followed by redressing and blending of used batches by weight. Distribution to mixing points would be by pneumatic conveyor where the flour batch would be held above the machine in readiness.

Sugar would probably be taken from a tipping type of bulk road vehicle and transported by bucket elevator and screw conveyor to the main silos. From these silos the

processing would take the form of grinding and grading with a pneumatic cooling unit after the grinder. The graded sugar would be held in ready-use bins which would feed, by gravity, an automatic weigher. From this weigher the sugar would be transferred to the mixers in the same way as the flour.

Fats and oils would be pumped from road tankers into storage silos. These would, where necessary, be temperature controlled to ensure that the contents did not solidify. From the main silos the fats would be blended by volume and cooled to a plastic state ready for use. The plastic fat would be stored in heated containers and be dispatched to the dough mixers by constant-volume pumps operating on a time basis.

Bulk liquids would be dealt with in much the same way as the fats, with heating and cooling arranged to suit the final process.

Trace liquids could be held in ready-use tanks above the mixers and fed by gravity through volumetric measurers.

Trace powders would be stored in day-use bins, probably fed by hand from small containers. Once bulked, the materials would be dealt with in a similar maner to the flour.

Control. The whole plant would be controlled from a central station which would incorporate push-buttons for controlling all machines and conveyors, running and conveyor routing lights, and pre-set batch controls for the various ingredients.

A punched card feed-in would be used to dispatch the correctly proportioned batches of materials to the various mixing machines at the correct time. This system could, if required, be used to time and control the actual mixing cycle. All pre-processing of the ingredients would be controlled from the panel and sufficient quantities of processed ingredients would probably be made during a single shift to last for a whole 24-hr. operation of the plant.

The panel would indicate the approximate stock levels of the various materials and telephonic communication with the intake site would be provided to ensure that incoming loads were correctly received and routed.

Fig. 5. The flour control panel in the biscuit factory of McVitie and Price, Ltd.

A panel of this type used for controlling flour processing, blending and distribution in a biscuit factory is shown in Fig. 5.

This description of a hypothetical handling plant indicates what is possible at the moment and, the writer imagines, describes the broad outline of a typical plant of the future.

It is certain that bread, biscuits and cakes will, where the output permits, be mixed by means of a continuous mixer when the technical problems associated with this process have been completely overcome. The handling plant described above will then be slightly modified, although the intake, bulk storage and pre-processing arrangements will remain unaltered. The blended ingredients will probably be dispatched to small holding bins or tanks above the continuous mixer, where they will be metered into the machine in the correct proportions.

The advantages of the continuous process are obvious since, once set and with adequate precautions, the mixing set will continue to operate without attention. Handling equipment and feeders to suit the continuous process are available and there is no doubt that this will soon become a generally accepted manufacturing technique.

Bakery Equipment

(*Concluded from page* 103)

unit free from all internal moving parts, and requiring the minimum maintenance on this account. The machine consists of a series of cylindrical filter elements enclosed in a dust-tight housing. Dust-laden air is admitted to the housing, and filtered air is withdrawn from the inside of the filters. When cleaning becomes necessary to remove the dust which has accumulated on the outside of the filters, this is accomplished by a device giving a reverse flow of air. The cleaning jets are controlled by solenoid valves actuated by an adjustable electrical timer, and frequency of cleaning can therefore be varied to meet load conditions.

Cleaning of equipment

The maintenance of sanitary conditions in food-preparing establishments is receiving increasing attention from all quarters, and the cleansing of bakery boards and trays is now attended to much more scrupulously than in former days. A machine designed for this purpose is supplied by the Hobart Manufacturing Co., Ltd. The machine is fully automatic and designed for straight-through operation in either direction. Travel speed for trays and boards is 500 ft. per hr., and units up to 24 in. in width can be accommodated. The trays are first washed from above and below with detergent solution at a temperature of 160°F., and are then rinsed with fresh clean water at a temperature of 180°F. to 190°F. This high rinse temperature ensures that the boards and trays dry rapidly on their emergence from the machine. The trays are carried on an oscillating cradle during the washing and rinsing operations, and this is fitted with a patented spring-loaded device which prevents congestion of the machine. Detergent water may be heated either by steam, gas, or electricity, and rinsing water may be similarly heated or may be drawn from existing hot water supplies.

FOOD MANUFACTURE
ANNUAL REVIEW

The Baking Industry

By D. W. E. Axford, J. B. M. Coppock and F. J. H. Ottaway*

Wheat flour ★ Bread, flour confectionery and biscuits ★ Technological advances ★ Refrigeration and deep freezing ★ Preservation of wheat flour and baked products ★ Analysis ★ Nutrition and enrichment ★ Conferences

THE trends to greater concentration of production units, apparent in the previous year, continued in 1957, and were accompanied as would be expected by increasing application of automatic processes. Perhaps the most novel development in the bakers' raw materials was the introduction of new flour-milling techniques permitting the production of flour fractions of varying protein content from a given grist. Much attention was devoted to methods for avoiding the production difficulties which might arise from the provisions of the Baking Industries (Hours of Work) Act which came into force on January 1, 1958. Legislative changes affecting the industry were few in number; the permissive list of colours proposed by the Preservatives Sub-Committee acquired legal force in July, 1957, the list having been modified somewhat in the preceding month. In the following month the Preservatives Sub-Committee added butylated hydroxy-toluene to the list of anti-oxidants recommended for inclusion on a permitted list, though the recommendations have not yet been enacted.

Wheat flour

The introduction of new methods of preparing flour by means of pre-grinding and air separation has aroused considerable interest.[1, 2] The finest fraction of flour consists of small starch grains and associated portions of protein and detached protein fragments, and if a suitable size separation of flour is made then the fine fraction contains a higher percentage of protein than the coarser fractions. By means of impact milling and centrifugal air classification a fraction containing 20% protein has been obtained from a soft wheat flour. Examination of a fraction containing 19·5% protein, obtained from a soft patent flour, showed that it could successfully be used to improve the baking quality of a weak bread flour.[3]

Newly milled and aged flour, in batters buffered to a *p*H of 6·5, showed considerable differences in their rates of uptake of oxygen from air. Comparable experiments with defatted flours and defatted flours in which the extracted lipids had been replaced suggested that the lipid is associated with the ageing of flour.[4] These findings have been independently confirmed[5, 6] and it has also been noted that the oxidation of poly-unsaturated fatty acids in flour doughs counteracts the effects of sulphur dioxide on the mixing properties of doughs and increases the oxidation of sulphydryl groups during mixing. However, changes that occur in the dough sulphydryl content due to mixing could not be correlated with changes in the dough extensographs. Of interest in this respect is a Swiss report that specific blocking of sulphydryl groups of gluten proteins in wheat flour leads to an improvement in the mechanical properties of the dough, which may be due to the prevention of an exchange between sulphydryl groups and di-sulphide bonds of the proteins.[7]

Investigations into the change in breadmaking quality of flour with age have shown that although some improvement is detectable during storage periods of about 4 months, this is less than would be produced immediately by gaseous or powder treatment.[8] In the case of bulk flour, only minor chemical and physical changes were noted over a 3-week storage period in a bulk railway car. The greatest changes occurred between the 7th and 11th days, though it should be borne in mind that the flour was subject to very wide temperature fluctuations.[9]

Although it has been known for many years that hydrogen peroxide exerts an improving action on flour, the substance has not had any commercial acceptance for this purpose. However, a patent has been taken out[10] in which the use of sodium carbonate perhydrate is described. It is claimed that this substance will act as an effective maturing agent.

In attempts to correlate farinograph, mixograph, sedimentation and baking data for samples of flour of widely different qualities, it was found that the only relationships which correlated sufficiently well to allow predictions to be made were baking and mixograph value, protein and sedimentation value, and valorimeter value (obtained from farinograms) and sedimentation value.[11]

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In recent years there has been a marked interest in means of evaluating flours intended for use in biscuits and two new methods have been reported during the past year. The normal method of evaluation of flours, using the Brabender Extensograph, will not satisfactorily separate biscuit flours, but by modification of the method better results can be obtained;[12] it is also suggested that complete biscuit doughs should be mixed and examined on the Brabender equipment. A new piece of flour-testing equipment devised primarily for the evaluation of biscuit flours has also been described.[13]

A number of papers have considered aspects of flour evaluation for breadmaking and flour confectionery purposes. From a comparison of the Brabender Extensograph, Chopin Alveograph and Simon Extensometer methods for testing bread flours, it is concluded that the standard methods used for these instruments require modification to ensure that the dough should be at the correct consistency at the end of fermentation, should contain yeast, should be rested at least 3 hours prior to final moulding and should be given adequate moulding, and these modifications are fully described.[14] In a study of the influence of the water-soluble constituents of wheat flour it has been shown that the mixing requirements of flour depend largely on these water-soluble components. Mixing time can be lengthened by removal of the water solubles and vice versa.[15] A new instrument for the assessment of the water absorption of flour has been developed;[16] its mode of operation being based on the penetration of a plunger into a piece of dough.

Three papers have been published during the past year relating to potassium bromate reactions in doughs. Fermenting and non-fermenting doughs mixed in nitrogen both lost bromate at a uniform rate of about 1-3·5 p.p.m. per hour. The rate of loss of bromate from fermenting doughs mixed in air was less than that from doughs mixed in nitrogen.[17] It has been shown that the introduction of complexing agents (phytate, oxalate or versene) with potassium bromate increased the effect of the bromate on the rheological properties of doughs, although the complexing agents themselves had no such effect. The enhanced rheological effect was paralleled by a greater loss of bromate. It was conjectured that the complexing agents decreased the availability of inorganic ions and that this made conditions favourable for an accelerated bromate reaction.[18] Studies on the effect of *p*H in bromated and unbromated doughs have indicated that the optimum bromate requirement decreased with increasing acidity in the *p*H range 7·0-4·7.[19]

X-ray studies of gluten, which have shown that certain wave-length spacings are characteristic of this protein, have led to the conclusion that although the bound fat constitutes less than 5% of gluten, it might be expected to have considerable influence on the cohesive and water absorbing properties of the whole gluten complex.[20]

Further experiments on the lipids of wheat flour have shown that the countercurrent distribution of the lipids is a useful systematic method for their study, since some of the fractions have markedly different effects on bread properties. Details of a system for countercurrent distribution of the acetone-insoluble fraction of flour oil have been given.[21] Analyses of hydrolysates of the fractions show high molar nitrogen: phosphorus ratios and the presence of polypeptide or protein throughout the distribution, suggesting lipid-protein complexes in the flour.

Radioactive tracer techniques have been used to study doughmixing. I^{131} has been incorporated in fat so that the dispersion of the latter in a doughmixing process could be examined, and the results emphasise the ease with which the operation can be studied using this technique. The results indicated that the mixer efficiency depended on its loading.[22]

Bread, flour confectionery and biscuits

A method of relating the degree of swelling of starch to staling in bread has been reported. During the retrogradation of starch as staling takes place, the extent to which the starch swells in a formamide/ammonium sulphate/sulphosalicylic acid solution decreases. Colorimetric measurements permit the degree of swelling to be estimated.[23]

The browning of cake crumb may be excessive when high concentrations of reducing sugars are used in the formula and increases in *p*H can accelerate the Maillard reaction. It has been shown that to prevent this acceleration crumb *p*H should not be higher than 6·4, to attain which the acid ingredient of the baking powder should be coated with hydrogenated fat so that the acid is only released during the baking process.[24] The identification of one of the browning reaction products having an ultra-violet absorption maximum at 287-293 μ has been attempted; the product is produced in the decomposition of 1-desoxy-1-piperidino-D-fructose and from the condensation products of glucose with phenylalanine and glycine.[25]

Interest has been shown in the use of Irish moss extractive or carrageenin as a possible bread improver. It has been stated to give increased mixing tolerance and improved oven spring and texture,[26] but these conclusions have not been entirely substantiated by recent work in this country.

Both the quantity of soluble dextrins extractable from bread crumb and their average chain length can depend on the concentration and source of α-amylase used in the formula. Bacterial α-amylase increased soluble dextrin and chain length; fungal α-amylase did not influence the quantity of soluble dextrin while chain length was several times less than with bacterial α-amylase; malted wheat flour increased the quantity of dextrin but had a similar effect to fungal α-amylase on chain length.[27]

In the application of fungal amylases and proteases in pre-ferment processes of bread production it has been found that no difference in bread quality could be observed whether the enzyme supplements were added to the pre-ferments or later to the dough.[28]

Investigations into the internal temperatures of products during the baking process has indicated that the maximum temperature attainable is a function of crumb moisture and only when this falls below 12-15% as in biscuits can temperatures rise significantly above 230°F.[29]

Technological advances

Trends towards more completely automatic plant continue to arouse interest. The development of continuous mixing in the U.S.A. has been well publicised in recent years, and it is interesting to note that in the U.S.S.R. over 100 continuous mixers of various types were in use by 1956.[30] One of the major differences between the methods used in the two countries lies in the fermentation process. In Russia fermentation is carried out after doughmixing and in "continuous" fermentation vats; this method is also used in Sweden.

For a fully automatic biscuit factory the Select-o-Weigh system can control, by punched cards, storage, weighing, metering, blending and conveying of ingredients selected automatically from a number of flours, pre-mixes, fats, etc.[31] An electronic scale has been manufactured which will deliver dry powders at the rate of 5 to 1,000 cu. ft. per hour at a pre-determined constant rate.[32]

There are two reports from Germany about high frequency (H.F.) and infra red (I.R.) heating for ovens. It has been shown that bread, rolls and meringues can be satisfactorily baked using a combination of H.F. and I.R. heating; this has the advantage of producing goods with a better volume and flavour, while baking time is reduced.[33] Infra red only has been used in an experimental oven; baking time for 0·5 kilogram wheat flour loaves was 16 min. and results superior to those obtained in a conventional oven were claimed.[34]

As an aid to the automatic bread depanner, compressed air jets penetrating inside the ends of the tins have been shown to assist the removal of the bread.[35]

The use of molybdenum disulphide lubricants in bakery ovens has raised the question of uptake of molybdenum by baked products. Analysis of cakes baked in an oven lubricated weekly for 6 months showed a negligible molybdenum uptake.[36] There has also been some interest in the possible use of polytetrafluorethylene as a "non-stick" coating for bread and cake tins. Experimental results have indicated that provided the tins were sintered at 626°F.-662°F. for a period of not less than 1 hour then subsequent fluorine uptake by the baked products was negligible.[37]

Refrigeration and deep freezing

There is wide interest in the retardation of doughs and the deep refrigeration of baked products, not only as a means of avoiding some of the problems introduced by the abolition of night work in bakeries but also to even out production, particularly at holiday times.

Deep refrigeration has introduced a number of problems which have received much attention. It has been found that excessive condensation formed during defrosting on a cellulose film or waxed paper wrapping of deep frozen baked goods renders the wrapping susceptible to damage; it was recommended that 120°F. and 50-60% R. H. were the most satisfactory defrosting conditions.[38] It has been found that white rings about $\frac{1}{2}$-$\frac{3}{4}$ in. beneath the crust of frozen bread are caused by bread remaining too long at a temperature of 15°F.–0°F. before cooling right down.[39] Measurements of heat required to thaw bread have been tabulated and graphed, and enable a rapid estimate to be made of the amount of energy in b.t.u.s required to cool bread of known moisture content through any temperature range between +75°F. and −50°F.[40]

It has been recommended that, with the exception of pies, baked products should be wrapped prior to freezing. Freezing is best done by using a blast of cold air so as to freeze the product as rapidly as possible.[41]

Preservation of wheat flour and baked products

Further work has been reported on the use of ionising radiations for sterilising or "pasteurising" wheat and cake mix. Wheat required doses of $0{\cdot}125 \times 10^6$ to $1{\cdot}0 \times 10^6$ rep gamma irradiation to destroy insects and fungal respiration.[42] Bread manufactured using flour milled from such wheat showed an improvement in quality as the dose increased to $0{\cdot}125 \times 16^6$ rep and then it deteriorated as the doses further increased. It has also been shown that gamma irradiation of cake batters at levels sufficient to destroy an appreciable percentage of the bacteria present has a deleterious effect. White cake mixes could tolerate doses of only 5×10^4 rep without serious deterioration and spice cake mixes up to 1×10^5 rep.[43]

Further work on the natural antioxidant properties of the tocopherols has shown that they have "carry through" properties when used in lard subsequently incorporated into biscuits and pastry.[44]

Analysis

Methods have been given for the determination of the four main classes of carbohydrates in wheat flour, *viz.*: starch, pentosan, sugars and cellulosic materials.[45] In the estimation of sulphydryl groups in wheat flour it has been reported that an amperometric titration at a rotating platinum electrode with either mercuric chloride or silver nitrate appeared superior to the o-iodosobenzoate titration.[46] The determination of gluten quantity has been carried out by shaking flour with NaOCl solution, centrifuging to remove starch and precipitating protein from the supernatant liquid to form a cloudy suspension, the turbidity of which was measured colorimetrically to give an indication of gluten quantity.[47]

Methods have been presented for the analysis of the 18 commonly occurring amino-acids in wheat and wheat products. In the manufacture of bread

from flour it was found that some of the amino-acids decreased in quantity and others increased due to the baking process itself and inclusion of milk and yeast in the bread formula.[48] In studies of the lipids of wheat flour the galactosylglycerol components have been characterised by extraction of flour with benzene, countercurrent distribution of the benzene fraction between n-heptane and 95% methanol to give four major fractions, and further fractionation of one of these.[49]

Nutrition and enrichment

Much of the more recent work on improving the nutritive value of bread has centred around its fortification with amino-acids, and some of the conclusions drawn from earlier work when bread was supplemented with lysine have been criticised.[50] Following rat feeding experiments it has been concluded that additional amino-acids would not remove the necessity of having at least small quantities of animal protein in order to achieve normal growth.[51]

The partial fatty acids of the sugar-alcohol anhydrides, polyoxyethylene derivatives thereof, and polyoxyethylene derivatives of fatty acids, have received wide attention as emulsifying agents in foodstuffs. Of these the report of the Preservatives Sub-Committee of the Food Standards Committee of the Ministry of Agriculture, Fisheries and Food has recommended only the sorbitan esters of fatty acids as permissible in this country. A good deal of pharmacological investigation into polyoxyethylene monostearate and those other compounds listed above has been carried out in the U.S.A. It has been demonstrated that in the metabolism of sorbitan monostearate the fatty acid esters of its polyhydric alcohol moiety are not deposited in the fat stores of rats. Feeding tests using various polyoxyethylene monostearates have produced conflicting conclusions.

New studies on the destruction of Vitamin E in flour by chlorine dioxide have indicated that each of the tocopherols was almost completely destroyed.[52] Improvement of flour with potassium bromate or ascorbic acid did not appear to decrease the tocopherol content of bread. Although these results on the effect of chlorine dioxide on Vitamin E are in line with earlier work, the conclusions drawn have been criticised.[53]

The suggestion has been made that chlorine dioxide destroys the essential fatty acids in flour with possible adverse effects on health,[54] but analytical studies have indicated that from the purely quantitative aspect there is little significant difference in the supply of these acids in chlorine dioxide treated as compared with untreated flours.[55] Earlier conclusions that the destruction of thiamine in bread is mainly thermal have been proved correct.[56]

Conferences

A number of valuable conferences were held during 1957. The problems involved in the use of chemical additives in foodstuffs in Great Britain and the U.S. and Canada were discussed at a Joint Conference of the Food Law Institute of the U.S., the Food Group of the Society of Chemical Industry, the Society for Analytical Chemistry and the Association of Public Analysts of Great Britain in London in July, 1957. A symposium was held on the nutritional aspects of flour and bread at Cambridge in the same month. On the more technological side, the Annual Technologists' Conference of the British Cake and Biscuit Alliance discussed a wide range of problems including the metering aspects of the bulk handling of ingredients. The technique of deep refrigeration was the subject of a conference held by the National Association of Master Bakers, Confectioners and Caterers in London in October, 1957. Finally may be mentioned a comprehensive symposium on the use of antioxidants in foodstuffs which was sponsored by the Low Temperature Research Station in Cambridge in April, 1957.

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FOOD MANUFACTURE
ANNUAL REVIEW

Milling

By A. J. Amos, B.Sc., Ph.D., F.R.I.C.

Wheat quality ★ Flour additives ★ Vitamin E and flour treatment ★ Flour fractionation ★ Amino acid composition of wheat protein

Wheat quality

DURING 1957 the grists from which bakers' flour was produced often contained approaching 70% of Manitoban wheat and in consequence this strong wheat from Canada constituted the bulk of the wheat importations. Samples from almost all the cargoes were analysed and otherwise tested in the author's laboratories, and in Table 1 are given the mean data for each grade calculated from the results of these analyses. The maltose figures were obtained by the Blish and Sandstedt procedure and are approximately 50% greater numerically than the figures which would have been obtained by the Rumsey procedure that was employed in analyses reported in the reviews of the industry for previous years. The stability and strength figures are derived from measurements made on a Chopin Alveographe.

A striking feature of these data is the small range of variation in the figures for any one characteristic; the highest and the lowest figures for protein differed by only 0·21 and for maltose figure by only 0·4, while there was a spread of only 10 units in the stability figures and only 5 units in the strength figures. Thus, although wheats in the different grades differed in soundness, plumpness and flour yield, the flours that came from them were very much alike in quantity and quality of protein and in diastatic activity.

Cargoes of another strong wheat, Northern Spring, were received during 1957, but the mean data of these arrivals from America were surpassed by those of the Argentine wheats which were imported. At one time most of the Plate wheats that arrived in Britain were of the filler class, but the mean data of the 1957 arrivals showed them to be almost as strong as the Manitobans and superior to them in protein content. The relevant figures are given in Table 2.

A wheat that had a mean strength figure similar to that which Plate wheat had at one time, and in this respect was a filler wheat, was American Hard Winter. The protein content, however, was superior to that of the Manitobans and indeed higher than that of any wheats imported into Britain. The mean data for 1957 were: protein 13·22%, maltose figure 2·4, stability 75, strength 46.

Three imported wheats which were similar in strength and well below the filler class were Australian, American Red Winter and French. Their mean data for 1957 are shown in Table 2.

These figures show that the protein of the Australian arrivals was more stable and less distensible than those of the other two wheats, but this tendency to some "deadness" in the gluten of Australian wheat is characteristic. This lack of balance of gluten properties was particularly marked in some arrivals in May and was responsible for some complaints of lack of liveliness in baking flours.

The weakest wheat imported during 1957 was Eastern White, the mean strength figure being below that of the weaker types of English wheat. These wheats showed also the lowest maltose figure for the year. The mean figures are: protein 9·23%, maltose figure 1·5, stability 35, strength 18.

The home-grown wheats examined during the year were grouped into two arbitrary groups with the dividing line at a strength figure of 30. The mean figures for the weaker group were: protein 9·84%, stability 46, strength 22, and for the stronger group: protein 10·62%, stability 66 and strength 36. In the earlier part of the year the maltose figure of each group was 3·7, but with the advent of the new crop in August/September this dropped to 2·4.

Flour additives

The substances commonly added to flour fall into two groups—the bleachers and improvers, which are added to meet the public's demand for white bread and to aid processing respectively, and the nutrients, vitamin B_1, nicotinic acid, iron and calcium, which are obligatory addenda. In neither group has there been any extension or reduction of the list of additives.

Chlorine dioxide has replaced nitrogen trichloride as the most widely used main improver, although it is common practice to employ potassium bromate or ammonium persulphate—particularly the former—as a supplementary improver. The dosage of chlor-

ine dioxide varies, but the average rate of treatment is about 1·9 g. per sack of 280 lb. As chlorine dioxide has rather less bleaching effect than nitrogen trichloride at the optimum level for dough improvement it is now customary for millers using gaseous treatment to augment the bleaching effect with a small amount of benzoyl peroxide.

Flours containing an amount of *creta præparata* outside the limits prescribed in the Flour (Composition) Regulations 1956 are still encountered, although the regulations permit a ±25% tolerance of the desired dosage. This is not due to a defection on the part of the miller who produced the flour, but usually arises from the difficulty of dispensing and distributing the *creta* uniformly in the flour.

During 1957 a retailer was summoned under the Food and Drugs Act 1955 for a deficiency of *creta* in a 3-lb. bag of self-raising flour. The industry's Research Association analysed the counter sample left with the retailer and found that its *creta* content was within the prescribed limits. The third sample was thereupon submitted to the Government Chemist who found that it contained a sufficiency of *creta*. In the circumstances the Local Authority wished to withdraw the summons, but on the advice of the millers the Defendant requested that it be allowed to stand and the case was heard and dismissed. Counsel for the Defendant in his address to the Bench mentioned that when the relevant regulations were introduced the Millers' Association expressed the fear of unreasonable and unjustified prosecutions, but was assured by the Ministry of Food that proceedings would not be taken except in the case of deliberate and persistent contraventions. He went on to say that the present proceedings suggested that this assurance may not have been brought to the notice of local authorities and hoped, therefore, that the events of the case would instil a proper and reasonable caution before proceedings of a similar kind were instituted in future. If the submission of the Public Analyst that in his sample there was a pocket of flour deficient in *creta* was correct, then there is added justification for Counsel's plea that proper and reasonable caution should be exercised before such proceedings are taken.

Table 1. Mean Data for Manitoban Wheats Imported During 1957

	Protein content %	Maltose figure	Stability	Strength
No. 1 Atlantic ...	12·14	2·5	99	66
No. 2 Atlantic ...	12·13	2·5	98	63
No. 2 Vancouver ...	12·11	2·3	100	64
No. 3 Atlantic ...	11·95	2·5	102	62
No. 3 Vancouver ...	11·93	2·7	102	63
No. 4 Atlantic ...	11·99	2·7	105	61
No. 4 Vancouver ...	12·10	2·5	108	64

Table 2. Mean Data for 1957 Arrivals of Manitoban, Northern Spring and Plate Wheats

	Protein content %	Maltose figure	Stability	Strength
Manitoban (all grades)	12·05	2·5	102	63
Northern Spring ...	12·08	2·4	89	59
Plate	12·64	2·1	102	61

Table 3. Mean Data for 1957 Importations of Australian, American Red Winter and French Wheat

	Protein content %	Maltose figure	Stability	Strength
Australian	9·41	2·5	77	28
Red Winter ...	10·15	1·9	47	30
French	9·60	2·3	56	32

Vitamin E and flour treatment

It was established fifteen years ago that treatment of flour with oxidising improvers could destroy some of the vitamin E that was present. Work undertaken during the last five years has confirmed that when the oxidising improver is chlorine dioxide the proportion of vitamin E destroyed is of the order of 70-80%. During 1957 Moore, Sharman and Ward[1] showed that although rats could be kept free from avitaminosis E if 80% of their diet consisted of untreated flour, treatment of that flour with chlorine dioxide at a level of 30 p.p.m. led the animals to suffer from vitamin E deficiency. These authors thereupon deduced that untreated flour could make a significant contribution to the vitamin E of our diet. This was an unwarranted deduction. Human beings do not consume flour but eat bread or other baked products and during the baking process 45% of the vitamin E is destroyed; no human being is going to elect from choice to have a diet in which bread, let alone flour, represents 80% of the total intake; the non-cereal portion of the diet of humans, unlike that of the diet of Moore's rats, will constitute much more than 20% of the whole and will not be devoid of vitamin E. The bread made from untreated flour analysed by Moore had a total vitamin E potency of 0·23 mg. per 100 g. and the daily consumption of 8 oz. of such bread would provide the consumer with about 5% of the average daily intake of vitamin E. This cannot be regarded as a significant contribution. Indeed, a more realistic appraisal of Moore's results is that they support the conclusion of Frazer[2] that "it is difficult to attribute any nutritional significance to the more rapid reduction of the vitamin E content of flour by chlorine dioxide or other forms of treatment."

Flour fractionation

During 1957 considerable advances in what has become known as flour fractionation were reported and much interest has been paid to this important development in milling technology.

The endosperm of wheat, which is the source of flour, consists of cells, each of which is filled with a protein matrix in which numerous starch cells are embedded. During the milling process some of these cells become broken—the softer the wheat the greater the cell damage—with the result that flours consist of a mixture of unbroken endosperm cells, fragments of protein matrix containing embedded starch, and free starch cells. Laboratory experiments revealed that by means of terminal velocity separations it was possible to remove the very small

starch granules and the fragments of protein matrix, and the fraction thus separated had a protein content approaching double that of the original flour.

The proportion of "fines" of high protein content separable from a normal flour (about 3%) was not great enough to be of practical use and attention was, therefore, given to the possibility of increasing this fraction by treating flour so as to produce more fragments of protein matrix. Success was achieved by the development of a specialised impact grinding technique that so increased fragmentation of the agglomerates of protein matrix that the fine high-protein fraction removed by terminal velocity separation was raised to 20%. Further examination of flour subjected to this impact grinding showed that a fraction of intermediate size that could be separated contained a high proportion of starch and consequently had a low protein content.

The relative proportions of the fractions obtained by this new technique and their protein contents will vary with the type of flour subjected to the process, but data quoted for a run with soft flour are an example of what can be done. A soft flour containing 10% protein was separated into the following fractions:

20% of a fine fraction containing 20% protein.
10% of a medium fraction containing 5% protein.
70% of a coarse fraction containing 8% protein.

Baking tests proved that the high protein fraction could be used to fortify flours intended for bread-making. The middle fraction of low protein content offered possibilities as a speciality cake flour, while the coarse fraction when obtained from a soft wheat, might be of particular value to the biscuit manufacturer. Further research on the subject is certainly required, but already the possibility exists that in flour fractionation we have the beginning of a new phase in milling technology.

Amino acid composition of wheat protein

It has been known for a number of years that wheat protein is deficient in the essential amino acid lysine, but information about the quantitative amino acid composition of the cereal portion of the national diet, which is over 25% of the total food intake, has been very inadequate; prior to 1957 no complete quantitative analysis of the amino acid content of our bread had been reported. In view of the growing trend among nutritionists to give attention to the amounts of various amino acids in a food rather than to its total protein content there was a need for a critical re-examination of the amino acid composition of gluten, and particularly of bread. McDermott and Pace, at the milling industry's Research Association, undertook the task, using a colorimetric procedure after separation by ion exchange. Their results[3] suggested that three amino acids might be involved in destructive reactions occurring during the formation of the crusts. As one of these amino acids is lysine, crust formation magnifies an already existing nutritional deficiency.

On the basis of their figures the investigators calculated the amount of each amino acid that a consumer obtains from his daily intake of bread and found the average daily consumption of flour and bread supplies five of the essential amino acids in excess of minimum requirements and a deficiency to be made up from other foods in the case of only two of them.

These workers also reported an analysis of the amino acid composition of flour and at about the same time Hepburn, Lewis and Elvehjem in America published a record of a similar investigation.[4] Bearing in mind that the British flour was a flour of 66% extraction and the American flours between 72% and 75% extraction, and also that the British workers determined the amino acids colorimetrically following separation on ion exchange resin, while the American investigators relied upon microbiological assays, the concordance shown by the two sets of figures is remarkably good.

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Advances in Food Technology

PIGS

Stunning by Carbon Dioxide

Carbon dioxide is a stunning agent which has the effect of reducing the sensitivity of the nerve cells and their connections (synapses). A mixture of 70% CO_2 and 30% air does not irritate the pigs but causes them to lose consciousness after 15 seconds. Consciousness returns 2 minutes after the animals are restored to normal air. The carcases of pigs slaughtered after stunning with not more than 70% CO_2 have normal properties and keeping quality. The *p*H value is normal and more constant than after electric stunning. The method is more economic and has a number of other advantages. It is used mainly in U.S.A., Denmark, Sweden and Holland.—S. M. Blomquist and N. E. Wernberg, *Die Fleischwirtschaft*, 1957, **9**, 750.

MEAT

Bacteria in Frozen Poultry Pies

Bacterial counts have been determined for frozen unbaked pies as purchased on the retail market in America, pies after baking at a constant temperature using a recording potentiometer, and pies after baking under family kitchen conditions. The pies were purchased over a period of 8 months from 5 manufacturers.

The examination of the unbaked pies revealed differences in the extent of bacterial contamination among the 5 brands which was thought to reflect the different sanitary and technological methods employed. Out of 40 unbaked pies examined 20 had total counts above 100,000 per g. and 18 had coliform counts above 10 per g. Enterococci were present in all the samples tested and coagulase-positive staphylococci found in 37 of the 40. Five *Salmonella* cultures were isolated from the unbaked pies.

The information obtained when the pies were baked indicated that the time and the temperatures given for some of the brands were insufficient to destroy the non-spore-forming organisms tested for. It was suggested that improved sanitary and technological methods should be introduced with regard to the preparation of these goods, more thought given to the baking times, and crusts formulated that would brown more slowly at the baking temperature.—E. Canale-Parola and Z. J. Ordal, *Food Technol.*, 1957, **11** (11), 578.

Radiation Resistance Studies

Radiation studies have been carried out on suspensions of pure bacterial cultures and on inoculated packaged meat samples. The samples were irradiated with gamma rays from a 561-curie cobalt-60 furnace emitting 1,600 rads per min., with a decay rate of 1% per month. The radiation chamber was refrigerated at 5°C. Samples were usually plated within 30 min. after treatment.

The studies showed that fresh beef stored in a humid atmosphere spoils rapidly due to the growth of *Pseudomonas geniculata* and related pseudomonads. In the culture media, 6,500 rads were adequate to kill 99% of the moderate population levels, these micro-organisms being among the most sensitive to gamma radiation. In meat juices aproximately 15,000 rads had the same effect. In higher population levels, the dosage necessary to give the same reduction was 23,000 rads in culture media and 34,000 rads in meat juices.

Fresh meat inoculated with moderate numbers of pseudomonads required 44,000 to 66,000 rads to kill virtually all the pseudomonads, this process extending the shelf-life of the beef 4-5 fold at 2°C. The irradiated beef eventually spoilt bacteriologically due to a radiation-resistant group of organisms which was found to constitute a significant proportion of the flora of fresh beef before being overgrown by the pseudomonads during storage at 2°C.—Eileen F. Wolin, J. B. Evans and C. F. Niven, Jr., *Food Research*, 1957, **22** (6), 682.

FRUIT

Concentration of Juice Flavours

Studies carried out at the Western Regional Research Laboratory in California on the concentration of the flavour principles of Concord grape juice to a form suitable for addition to fruit juice powders showed that this could be achieved without apparent alteration in the flavour of the juice.

The steps in the experimental procedure included recovering the flavouring constituents by flash vaporisation and rectification, concentration by distillation with a bubble-plate column, further concentration with iso-pentane, addition of rice oil or sesame oil as an extender, and removal of the iso-pentane. Finally the flavour concentrate was locked in a sugar mixture or sorbitol.

Up to a concentration of 330-fold there was no alteration of the flavouring component. The product improved the flavour of reconstituted grape juice powder, giving the juice a more pleasing and natural aroma.

Chemical analyses showed a low recovery rate of methyl anthranilate, believed to be an important flavour constituent, in the first step and a low retention of the total volatile esters in the last 2 steps. It was thought, however, that important unidentified flavouring constituents probably came through the process with a better yield.—K. P. Dimmick, T. H. Schultz and B. Makower, *Food Technol.*, 1957, **1** (12), 662.

Improved Canning Machinery

Improvements have been made in a number of well-known canning industry machines made by Mather and Platt, Ltd., details of which had to be held over from our special Canning Review last month. The Mk. XII super pea viner is now offered with a choice of either a rubber- or an aluminium-slatted main apron. The full length feed elevators have splayed sides to facilitate loading and a quick release clearing flap is fitted at the top of the clutch and shearpin driven elevator. The riddle and beater drums are of the tapered design resulting in a progressively harder beating action down the length of the machine. The riddle drum is now driven positively and this, coupled with the opening up of the discharge end of the drum, gives this machine its particularly high performance. The vine input capacity of the machine is normally between 4 and 7½ tons per hr. giving an output of 25/30 cwt. of shelled peas or more per hr. according to yield. In many instances this machine is used not only on vine but also on pods. A new development is the even feed regulator which can now be fitted to avoid the reduction in working efficiency on account of uneven loading.

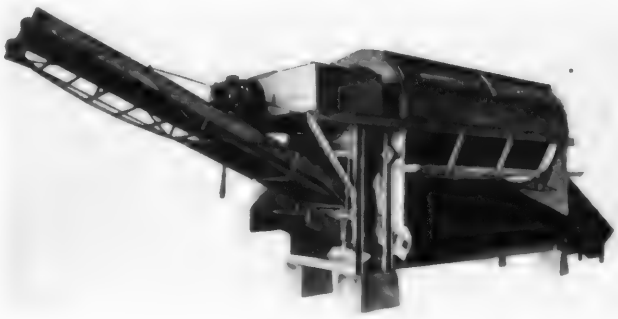
Whilst the viner is used for the thrashing of broad beans both on or off the plant, a special roller type podder is now offered. Here the beans are removed from the pods cleanly by a gentle squeezing action between rubber rollers.

The Mather and Platt all metal winnower coupled with the improved flotation washer, gives an efficient means of preparing garden peas for the canning or freezing line. In the winnower, particular attention is paid to the accessibility of all parts for cleaning and in the washer to the efficient use of re-circulated water and the final cleansing of the product by means of fresh water sprays. The winnower-washer combination is designed for a 4-viner line with a throughput of about 4 tons of peas per hr.

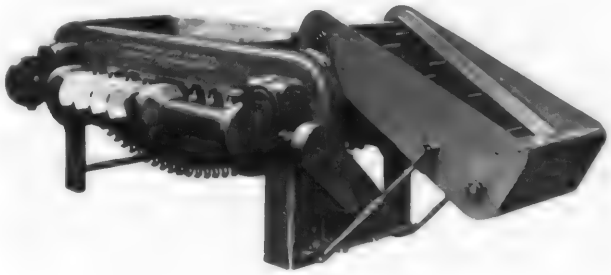
The rotary drum type grader is now offered on the new Grovesend grader, the operation of which is based on an expanding roller conveyor. This latter machine is suitable for any product which is capable of rotation on top of a roller conveyor and which is within the size range of ⅜ in. and 1½ in. diameter. The product is fed automaticaly by an inclined elevator/hopper on to a bed of rotating and advancing rollers, the pitch of which increases progressively along the length of the machine. Initially, the small waste or culls are removed and later the fruit drops gently between the rollers on to a transverse delivery belt. Oversize product passes over the end of the machine. Economical use of floor space and avoidance of damage are special features of this machine. The normal output is from 2 to 5 tons per hr.

In the "Oyster Type" blancher particular attention is given to the accessibility of even the spiral of the inner drum for cleaning and inspection and also to the maintenance of the machine at an operating temperature outside the danger zone. The standard centreshaft machine is offered in a number of lengths from 5 ft. 5 in. to 18 ft. to suit the throughput or time of blanch required.

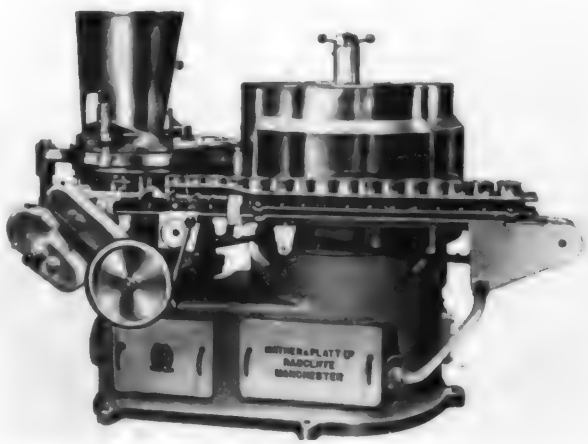
In the new solid and liquid filler the solid and liquid components are filled on 12 and 16 pocket heads respectively and the valves on the liquid head have been designed particularly for hygienic operation and easy removal for cleaning. The machine is available in either bronze or stainless steel contact parts suitable for the full can range required by the present market. It is capable of speeds approaching 300 c.p.m.



Super pea viner.



Grovesend fruit grader.



High speed solid and liquid filler.

Machinery and Equipment

DRIP-PROOF ELECTRIC MOTOR

A new "C" type electric motor has been introduced by Brook Motors, Ltd., who state that it has been built to conform with the latest ventilation and electrical performance with Class E insulating materials standards. In the ventilation system the cooling air stream is drawn into the ends of the motor, guided by pressed steel air deflectors, which also serve as additional protection for the end windings, and after passing over the windings, is expelled through openings in the yoke casting.

The newly amended B.S.2613, for electrical performance, permits a maximum temperature rise of 65°C. under continuous maximum rating conditions. Brook claim to have obtained better starting performance and cool running, well below the limits imposed with full output.

The terminal box can be rotated to four positions as also can the end-shields, making versatile mounting a simple matter while retaining the full protection of the drip proof design.

Shafts are of tensile steel, rotors have integrally cast fans and the whole shaft assembly is dynamically balanced on electronic machines to give quiet running on pre-loaded medium ball bearings.

A range of motors similar in appearance except for smaller diameter shaft extension is also being produced to the NEMA (American) rerate specification. These motors have Class "A" insulation and are made for use on 60 cycles supply. They are already being sold in the U.S.A. through their subsidiary company in Chicago and their agents in Canada.

SPECTROPHOTOMETER PRISM

The latest version of the *Uvispek* spectrophotometer made by Hilger and Watts, Ltd., has a new prism made of synthetic fused silica. The silica is much more transparent than quartz at wave-lengths below about 2,500 angstroms.

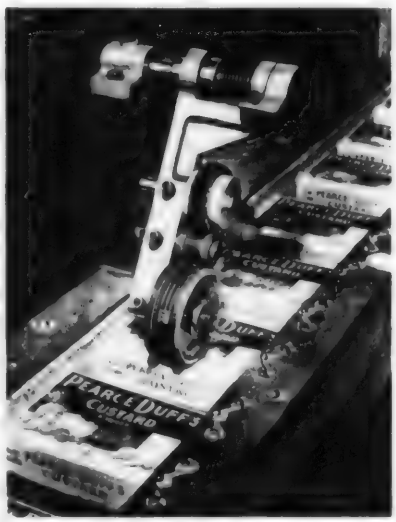
According to the makers, the new prism gives a much better ratio between transported light and stray light at short wave-lengths. The effect of stray light is reduced to negligible proportions at 2,000 angstroms and below, and the range of the instrument is extended down to about 1850 angstroms.

It is pointed out that the instrument was designed for interchangeable prisms and the new prism can be used with all but the earliest models.

SPRAG CLUTCH

Renold Chains, Ltd., have added another product to their range of power transmission accessories. Known as the *Renold Sprag Clutch*, there are more than 70 standard sizes available ranging from 50 lb./in. to 136,500 lb./ft. torque capacity and ·250 in. to 12·00 in. bore size.

The *Sprag Clutch* can be used as a free wheel, a one-way or "hold back" clutch, and as a means of indexing. The design allows for a full complement of sprags, giving, it is claimed, high torque capacity combined with comparatively small size. A particular feature is that no backlash can develop throughout the working life of the clutch. In most cases the sprag clutch is supplied complete with sleeve or anti-friction bearings.



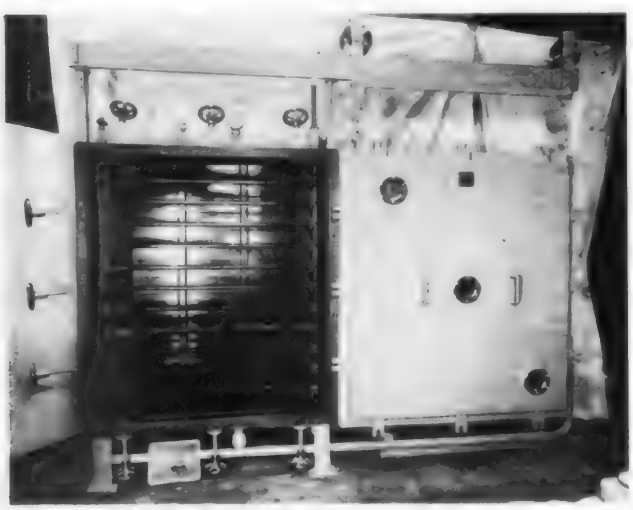
The Codapack carton coding unit, made by the Sauven Perforating Machine Co.

AUTOMATIC CODING UNIT

The latest model of the *Codapack* carton coding unit, the Mark IV was recently introduced by the Sauven Perforating Machine Co.

The unit gives a printed code on small cartons, which may travel on any conveyor system or through the compression section of a carton sealing machine. The type drum, the diameter of which is 3 in., rotates by frictional contact with the item being marked. One or more sets of type may be placed round the periphery of the drum base, giving an impression at given intervals.

The type used in this machine is the *Baselock*, which fits into the ribbed, rubber base on the type drum.



The new Apex vacuum tray drier, which is coated internally with epoxy resin paint.

NEW FINISH FOR DRIER

An epoxy resin paint has been used to give an improved internal finish to a new vacuum drier manufactured by Apex Construction, Ltd., who believe that this is the first time the paint has been used for this purpose. The paint is said to have a high resistance to corrosion and to give a paint seal which is tough and flexible and adheres strongly to the metal walls. For this particular application, the epoxy resin paint *Araldite* 985E has been chosen.

The new drier is known as the *Apex Model 105E* vacuum tray drier. Another of its features is the hanging of the door, which is mounted on a runner rail for ease of manipulation.

The New Welbeck Floor Master suction cleaner, the latest addition to the range.

CONTROL VALVES

A multi-point "packaged unit" of control valves for pneumatic or hydraulically operated machinery has been introduced by the Baldwin Instruments Co., Ltd. Any number of valves up to 12 can be embodied in the unit, and the valves may be fitted with manual, mechanical, electric solenoid or pilot operating mechanisms. The supply and exhaust ports of all the valves are led into passages running the full length of the assembly, screwed connections being provided in special end pieces. Each end block contains one supply and one end tapping, which are common to all valves. Tappings in each individual valve body provide fluid take-off points for solenoid pilot heads, where these are used. Each main control valve is, therefore, a functionally independent unit.

It is claimed that the drastic simplification effected by this unit, eliminates no fewer than 15 connecting pipes in the 8-bank, solenoid-controlled pneumatic unit which is illustrated. With a 12-point double-solenoid operated unit, the total number of interconnecting pipes is said to be reduced from 84 to 2.

At the present time, these "packaged units" are available in a ¼ in. bore, 4-way pattern only.

POWDER COLLECTOR

Improved quality standards and efficiency are claimed to have been achieved in the dried milk factory of Aplin and Barrett, Ltd., by the installation of a multi-cyclone powder collector. Called a *Mancuna-Microclone M40A*, and made by the Mancuna Engineering Co., Ltd., it is fitted in a conventional plant where condensed milk of 40/45% solids content is fed into an atomiser, the bowl of which is running at 9,000 r.p.m. from whence it is dried in a chamber by an air stream at 300°F. The larger particles, about 50% of the whole, are caught at the bottom of this chamber. The remainder are carried by the air stream which passes through the 96-tube Microclone unit at about 11,000 c.f.m. at 205°F. The makers say that 99·7% of the powder, which is in the 1 to 10 micron size range, is recovered. The powder from the drying chamber and the unit is carried by a pneumatic system to the packing room where it is collected by a small cyclone and then sieved and packed. A small proportion of the powder in the packing room is not collected by the cyclone and the exhaust air is returned to the Microclone for further extraction.

In the unit the cyclones are arranged in 2 elements, each containing 48 cyclones in rows of 6 and each mounted at an angle of 45° in the housing. The unit housing has channel extensions which serve as pivots for arms on the cover and tube plate. Both can thus be swung open to give accessibility to all parts for regular cleaning.

It is stated that there is no fire hazard inherent in the operation of the small cyclone.

FLOOR CLEANER

A machine, called the *Floor Master*, designed for the easy cleaning of large floor areas has been introduced by New Welbeck, Ltd. This model has been produced to meet the widespread need for a machine of this type in industry.

The *Floor Master* models are fitted with two or three detachable twin turbine power units, and the canister is mounted on a 3-wheel trolley with the handle fixed at the rear of the machine. One of the main features of this model is the detachable short large bore rigid extension tube and wide nozzle at the front which sucks dust and other litter from the floor. It can also be used with a flexible hose and accessories for overhead cleaning.

The entire range of New Welbeck industrial suction cleaners is suitable for use on any standard voltage (lighting circuit). Special low voltage power units can also be supplied.

The Mancuna-Microclone M40A collector showing the arrangement of the 96 cyclones in 2 elements. In the foreground is the air intake to the pneumatic conveyor system.

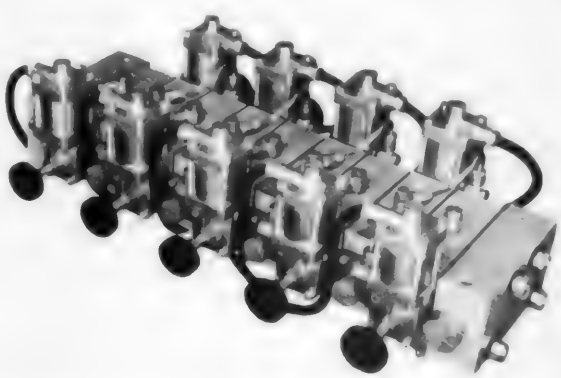
GLASS PIPELINES

The Ely Brewery Co., Ltd., decided two years ago to replace two 250 ft. 2½ in. diameter copper hot wort mains with *Visible-Flow* 2 in. i.d. glass pipelines made by Q. V. F., Ltd.

The narrower pipeline was sufficient to meet the need to handle 80 gal. per hr. The complete main, including all the hanging brackets, was installed in four days. The pipeline, keeping close to walls or ceilings, rises through a vertical lift of 75 ft.

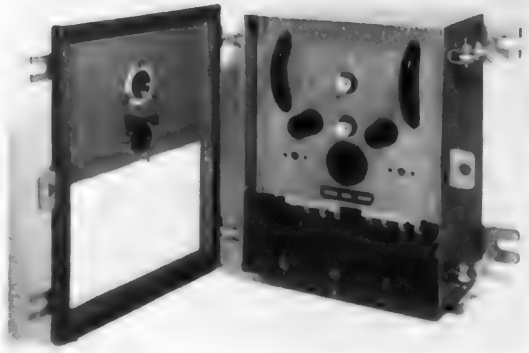
The makers say that during two years use in pumping wort at 200°F. breakage has been negligible, and the only maintenance required was the occasional replacement of joint gaskets. On-the-spot cleaning using weak detergent and frictional scouring with sponge rubber balls, was satisfactory.

Ely later installed a further 250 ft. run of 3 in. pipeline, handling hot wort at 120 barrels per hr. and a shorter 1½ in. line in the bottling stores where the low thermal conductivity of the glass is claimed to reduce the heat pick-up between filter and filling machine.



Control valve unit made by the Baldwin Instrument Co., Ltd.

Left: **Automatic temperature controller, made by the Foster Instrument Co., Ltd.** *Right:* **Tektor Major level controller, showing the quick-release chassis.**



TEMPERATURE CONTROLLER

A low-cost, fully automatic temperature controller has been developed by the Foster Instrument Co., Ltd., for use in association with their special fast-response thermometer elements, which they say provide a degree of control not normally obtained with standard elements.

The temperature ranges of the instrument cover from −50°C. up to 350°C., the 15 in. long scale being overprinted with the equivalent Fahrenheit range. All the resistances comprising the Wheatstone Bridge system are calibrated accurately and aged to eliminate control point drift.

The control operates on a differential of 0·1°C., but can be detuned by the sensivity control to up to 5°C. Within wide limits mains voltage variation has no effect on its accuracy. The electrical connections are made to terminals inside the instrument case.

LEVEL CONTROLLER

A new capacity-operated level controller, the *Tektor Major*, has been developed by Fielden Electronics, Ltd. A control knob situated inside the case on the front of the chassis enables the set-point to be easily adjusted on site. Once adjusted, a note may be taken of the reading for future reference. The chassis can be removed quickly and easily by a simple quarter turn on the holding screws.

The sensitivity of the instrument is claimed to be better than 1·0pF under all conditions. Negligible effects ensue from (*a*), a ± 10% change in supply volts, (*b*), an ambient temperature change of from −20°C. to 50°C. or (*c*), a lapse of time. In the case of the control point the zero drift as a result of these conditions is claimed to be not more than ±1·0pF., not more than 2·0pF (referred to 20°C.) and, not more than ±1·5pF. The relay is of the contactor type, guaranteed switching capacity 440 v. 5 amps. A.C. non-inductive. One pair of contacts is normally open, one pair normally closed. Contacts are easily replaceable.

For the high level model, standard lengths of cable are 6, 12, 20, 30 with 35 ft. maximum and for the low level model 6, 12 and 20 ft. The unit may now be installed some distance away from the probe. The performance of the instrument is independent of cable length up to the stated maximum.

A voltage selector switch enables the instrument to be set, on site, for any supply in the 110-125, 220-250 and 380-440 v. ranges, 40-60 c/s. Two long-life indicator lamps are incorporated, one of which is on at all times. The unit is also fitted with Canadian Standards Association-approved terminal blocks and has a sheet metal weatherproof case.

ELECTRONIC PACKING AIDS

The automatic weighing and packing of granulated sugar into 2 lb. paper bags at the Silvertown factory of Tate and Lyle, Ltd., is done on *Titeseal* bag filling and sealing machines of Brecknell, Dolman and Rogers, Ltd., in conjunction with Southall and Smith weighing machines.

Fitted to these machines is an electronic "no-bag no-fill" device which consists of a P.12 electronic control unit produced by the Electronic Machine Co., Ltd. The paper bags, which lie horizontally on their sides in the magazine, are taken singly from the magazine by means of suction caps. A second set of suction caps takes the bag to the filling funnel and in so doing, the bag is turned into a perpendicular position and passed through a light beam.

This action sets the filling cycle in motion, the bag being blown open and the sugar allowed to enter. The filled bag then passes to the sealing section.

In the event of the bag magazine being empty or for some other reason there is no bag, the relay in the scale tipping circuit causes the sugar to be held until a bag becomes available. The sealed bag passes to a marshalling section where operators form the bags into units of 14. These units of bags then pass into a *Drohman* parcelling machine which wraps the unit in brown kraft paper.

The parcel now goes on to the take-off conveyor and passes through a further light beam provided by an Electronic Machine Co. P.12.C. electronic counter. The count is registered on a remote display counter which is housed in the packaging floor supervisor's office where all the information is collated.

PROCESS CONTROL WITH RADIO-TRACERS

The introduction and manufacture in Britain by Nuclear Enterprises (G.B.), Ltd., of scintillation counters (*Scintillometers*) for industrial tracer investigations appears to have applications in quality and production control departments.

The *Scintillometer* can be used to follow the progress and behaviour of one or more selected raw materials or ingredients simultaneously through the pipeline of processing and mixing at any stage of manufacture, and to locate trouble at the precise point where no visual means exist.

Short-lived radio-isotopes or radio-tracers are used in this equipment. Usually only gamma radiation of the tracer is counted, and an analysis is made of the intensity and energy of this radiation. Where the labelled material or substance flows in open ducts or conveyors however, beta counting may be applied. The same holds for samples taken from different parts of the process.

Measurements are carried out in normal conditions and if conditions of high humidity, moderately high temperatures or dusty atmosphere exist, these are taken into account in the design. The scintillation ratemeters used are suitably protected and can be portable. The instruments are normally constructed in two parts, *viz.*, (1) the scintillation detector proper which can be placed on pipes, conveyors or troughs, and (2) the auxiliary electronics containing ratemeter, controls, current supply, and recorder, all of which can be placed up to 1,000 ft. from the detector if desired.

In some cases the makers say it may be necessary to provide an auxiliary automatic counter in connection with the channel analyser. If necessary, the instrument can be battery operated.

News Digest

Bacon imports talks

The Minister of Agriculture, Fisheries and Food, Mr. John Hare, has agreed to discuss the problems which face the bacon industry in this country with the farmers and the curers. While a date has not yet been fixed for the meetings it is understood that the Minister wishes for early talks with the representatives of the curers, the National Farmers' Union and the Fatstock Marketing Corporation, which normally handles about 90% of the country's bacon pigs.

The prices of home-cured bacon have slumped in the face of mounting stocks of imported bacon. Farmers are finding that they can get more for their pigs as pork and the curers say that they are working at only 25-30% capacity. The curers advocate control of imports of bacon and the farmers favour regulation of all pig product imports.

At present there is no restriction on imports, apart from a 10% *ad valorem* tariff.

B.B.I.R.A. research director

The British Baking Industries Research Association has announced the appointment of Dr. G. A. H. Elton as director of research to succeed Dr. John Coppock, who recently took up an appointment with Spillers, Ltd.

It is hoped that Dr. Elton, who is at present reader in applied physical chemistry at Battersea College of Technology, London, will be able to take up his duties at the Association's laboratories at Chorleywood on May 1.

Appointment at new Birmingham college

The Birmingham Education Committee, who established a separate College of Bakery, Catering, Domestic Science and Associated Studies last September, appointing Mr. R. W. Long, F.I.B.B., M.H.C.I., as principal, have opened separate departments of bakery and catering in the new college.

MR. E. J. TIPPER, F.I.B.B., A.R.S.H., a former student of the old Birmingham School of Bakery, has been appointed head of the bakery department. He is well known in the trade as the secretary of the National Joint Apprenticeship Council in the West Midlands area. He is a member of the British Chapter of the American Society of Bakery Engineers.

Research appointments

The Borough Polytechnic Department of Chemistry and Food Technology announce that Miss P. Wills of Australia, has been appointed research assistant, and Mr. A. J. Showler, M.SC., A.R.I.C., and Mr. B. W. Nichols, M.SC., have been awarded research scholarships for work on fats, out of funds provided by the Nuffield Foundation.

Mr. M. S. Chaudhry, M.SC. (Pakistan) will be working in the department during the session as a Colombo Plan Fellow, in oils and fats.

Starch convention

The International Starch Convention, 1958, which is being organised by the German Cereals Research Association is to be held at Detmold, West Germany, on April 22-24. In all, 22 papers will be read, the subjects being grouped under the headings: research and analysis, starch fractions and derivatives, and starch manufacture and practice.

The annual conferences of the Potato Research Association and the International Starch Standardisation Association will be held in conjunction with the convention.

Pre-packing conference

In a speech at the annual luncheon of the Produce Pre-packaging Development Association, Mr. Joseph Godber, M.P., Joint Parliamentary Secretary to the Ministry of Agriculture, Fisheries and Food, announced that an international exhibition and conference on the pre-packing of fresh fruit and vegetables is to be held in London on October 7-9, 1958.

The exhibition, the first exhibition of its kind in Europe, will be held in the Royal Horticultural Society's New Hall, Westminster. It will be organised by the Ministry on behalf of the European Productivity Agency of the O.E.E.C. The latest developments in pre-packing of fresh fruit and vegetables in Europe will be displayed around the central theme of "Pre-packing from Field to Consumer." Space will be available for commercial display by manufacturers, distributors and packers, of machinery, equipment and materials, and of pre-packed produce.

The Ministry is working in conjunction with the Produce Pre-packaging Development Association who will act as exhibition agents.

Use of insecticides

A dossier has been issued by the Ministry of Agriculture, Fisheries and Food, giving the Government's current recommendations on the use of certain chemicals in agriculture and food storage. With reference to the latter use, the only 2 compounds considered are the insecticides dieldrin and *Dipterex*. For the use of dieldrin, simple voluntary precautions, such as the wearing of rubber gloves, and in certain instances mouth masks, by operatives handling the compound, are recommended. For the protection of consumers, it is pointed out that dieldrin should not be allowed to come into contact as a dust or spray with any foodstuff, or with the insides of any equipment used in food processing. It should not be used as a smoke in areas where food is stored.

The use of *Dipterex* as a ready-prepared fly-bait is not considered to present any hazards to operatives or consumers.

Sugar surcharge

The Sugar Board last month ended distribution payments on sugar, which were equivalent to about ¼d. per lb. on refined sugar. The board will instead levy a surcharge of about 1¼d. per lb. on this commodity.

Anouncing these changes, a recent statement by the Ministry of Agriculture said that the first-hand price of refined sugar in the home trade would rise by about 1¾d. per lb. as a result.

Surcharge repayments, payable by the sugar board, were also re-introduced on goods which become entitled to drawback of sugar duty and on which surcharge is paid.

Control of outworking

The giving out of shrimps, prawns or onions for peeling to outworkers in domestic premises will not be allowed after June 1, 1958, unless the premises are registered for the preparation of the food in question with the local authority and certain other requirements in the Food Hygiene Regulations, 1955, are complied with. This is the effect of the Food Hygiene (Amendment) Regulations, 1957, made jointly by the Minister of Health and the Minister of Agriculture, Fisheries and Food.

The requirements that must be complied with at the outworker's premises already apply to food prepared on recognised food premises.

PEOPLE

MISS LOUISA P. GIBB has taken up the position of general factory manager at the Birds Eye quick-freezing factory at Kirkby, Lancs.

Born in London, Miss Gibb graduated at Liverpool University, attaining her B.SC. in 1926. She was first employed as a chemist with Lever Brothers at Port Sunlight and later joined the Aeronautical Inspection Directorate of the Air Ministry at Kidbrooke.

In 1932, Miss Gibb joined Smethursts at Grimsby. Initially working with the production management and then in the sales department, Miss Gibb acquired an all-round knowledge of the business. Specialising in technical matters, she was progressively appointed production manager and works manager and became a director of the company in 1956.

In January 1957, Smethursts was amalgamated with the Birds Eye quick-freezing organisation and Miss Gibb was appointed as a production manager for Birds Eye. This development gave Miss Gibb still wider opportunities for her energies and talents, resulting in her latest appointment.

MR. W. R. HORBERRY, who has been responsible for the Kirkby factory since it opened in 1953, is returning to London to take up a further appointment within the company.

*

MR. W. KENYON, B.SC., A.R.I.C., F.P.S., general production manager of Maconochie Bros., Ltd., has been made a director of the firm. He is 37 and was educated at St. Mary's College, Blackburn and at Nottingham University. He is a graduate member of the Institution of Chemical Engineers.

Before joining the firm in 1952 as food technologist, he worked for the Distillers Co., Ltd., and was also an industrial consultant.

*

MR. B. R. WISDEN, who joined Smedley's, Ltd., in 1946 as an accounts clerk has been appointed general sales manager for frozen foods. He began at Smedley's Wisbech (Cambs.) works in January, 1946—shortly before the firm resumed full quick-freezing production. By 1953 he was assisting in the production and quality control of frozen foods at Smedley's Wisbech and nearby Spalding factories, combining this post with that of Midland area sales manager. He is 43.

*

W. M. DE MAJO has been appointed consultant designer to Transparent Paper, Ltd., where he will work in close co-operation with the assistant managing director, Mr. R. M. T. Kerr and the sales manager, Mr. J. Ward. He will be responsible for the establishment of a co-ordinated design policy and also be available for consultation on special design assignments for the company's major clients.

Miss Louisa P. Gibb.

*

DR. DIETMAR RIEDEL, formerly manager of the Fisheries Association of the County of Hessian, has been appointed assistant regional fisheries officer for Europe and the Near East by the Food and Agricultural Organisation. He will work at the Rome headquarters of FAO under the direction of Mr. M. J. Girard, the regional fisheries officer.

*

MR. W. J. W. PROCTOR, sales director of Follsain-Wycliffe Foundries, Ltd., was due to arrive in Johannesburg at the end of February. After visiting the district he is to make a tour of North and South Rhodesia to carry out a sales survey and to handle their castings, *Pulmac* pulverising mills and also variable speed gears and speed reducers made by their subsidiary company, Varatio-Strateline Gears, Ltd.

■

Owing to ill-health, MR. F. W. RUMBALL has retired from his position as works director of Flexile Metal Co. Ltd., but he will continue his long association with the company as outside consultant. He joined the company soon after its formation in 1919 and succeeded his father as works manager in 1938, being elected to the board in 1940.

MR. E. A. THORNE, formerly the works manager of Flexile's Holloway factory has been appointed general works manager of Flexile Metal Co., Ltd.

MR. L. E. GRAY, O.B.E., was elected chairman and MR. C. S. PRYOR, vice-chairman, at the A.G.M. of the Tea Trade Commitee. Mr. Gray is a director of Brooke Bond and Co. Ltd., and Mr. Pryor is a director of Pryor and Tindall, Ltd., and represents the Ceylon producers on the committee.

■

MR. M. F. CROW has taken up the new post of general sales manager at the Willesden headquarters of T. Wall and Sons (Meat Products), Ltd. He joined the firm in 1952 and was London sales manager before going to their Godley (Manchester) factory as meat general manager in 1955.

MR. D. G. SOUTHWELL succeeds to the position of meat general manager at Godley. He was formerly northern meat sales manager, a post now filled by MR. C. R. CLARKE.

■

MR. J. G. MUIRHEAD, fruit and vegetable production director of Eskimo Foods, Ltd., has resigned from the board. He was a director of Frigidfruits, Ltd., and Frigidfish, Ltd., until October, 1957, when they merged with Grimsby Frozen Products, Ltd., to form Eskimo Foods, Ltd.

Obituary

A director of Lea and Perrins, Worcester, until he reached the age of 85, MR. CHARLES WILLIAM DYSON PERRINS has died at his home at Malvern. He was 93.

Educated at Charterhouse and Queen's College, Oxford, Mr. Perrins was, with his father, responsible for the introduction of Worcester sauce. His father was a member of a Malvern firm of chemists, and tradition has it that the original recipe for the sauce came from an Army officer who had served many years in India. The recipe was a closely guarded secret.

Mr. Perrins will be remembered for his many benefactions. It is estimated that his gifts amounted to more than £100,000, some going to Oxford University for chemical research at the Dyson Perrins Laboratory. He was a Freeman of Worcester and a well-known art collector.

He was Mayor of Worcester in 1897, Sheriff of Worcestershire in 1899; was a Governor of Birmingham University, and chairman of the directors of Worcester Royal Porcelain Works.

Sales office

Brian, Jenks and Co., Ltd., canned good importers, have opened a sales office at Produce Exchange Building, 8, Victoria Street, Liverpool, 1. Tel: Central 7395.

FORTHCOMING EVENTS

Society of Chemical Industry

Food Group

March 5. Relationship of chemical composition to quality of fruit and vegetables for canning. By Dr. D. Dickinson. The free amino-acids of certain fruits. By Mr. L. F. Burroughs. At 6·15 p.m. Address: 14, Belgrave Square, London, S.W.1.

March 12. Joint meeting with the Microbiology Group. The prevention of microbiological spoilage in fruit. By Dr. V. L. S. Charley and Dr. T. G. Gillespy. At 6·15 p. m. Address: 14, Belgrave Square, London, S.W.1.

Royal Society of Arts

March 12. World hunger as a biochemical problem. By Mr. N. W. Pirie, F.R.S., head of biochemistry department, Rothamsted Experimental Station. Meeting at 2·30 p.m. Address: John Adam Street, Adelphi, London, W.C.2.

The Society for Analytical Chemistry

North of England Section

March 28. Joint meeting with the R.I.C., Tees-side Section. Residues in foods deriving from processing, hygiene and manufacturing aids. By Dr. J. B. M. Coppock and Mr. R. A. Knight. At 8 p.m. Address: William Newton School, Junction Road (Stockton-on-Tees.

Dehydrated food conference

The final programme of the Conference on Fundamental Aspects of the Dehydration of Foodstuffs, which is being held at Aberdeen University, March 25-27, has now been arranged. In addition to the 6 conference sessions, a visit has been arranged to a factory dehydrating food on a commercial scale. Details of the programme can be obtained from the General Secretary, Society of Chemical Industry, 14, Belgrave Square, London, S.W.1.

Dexion exhibition

A cocktail party was held recently at N. C. Brown, Ltd., of Heywood, in connection with the Dexion exhibition and film show. Representatives of trade publications, local dignitaries and the local heads of industries were present.

N. C. Brown are leading distributors of Dexion equipment.

Correct address

Miranda Nut Products, Ltd., whose formation was announced in our January issue, wish all communications to be addressed to them at 39, Nicholas St., Chester, and not to the address previously given.

OBITER DICTA

● Sing we the mushroom's special favours, its gentle yet persuading flavours. Join in our song, and praise the stellar virtues of this minute umbrella. But let this present lay be thine, our own, our darling Valentine. —*Valentine from the Mushroom Growers' Association.*

● One Smithfield porter pushed his truck through the smoke singing, "I Don't Want to Set the World on Fire," while another, with a straight face, pointed to the smoke belching from the Poultry and explained to 2 young office girl sightseers that it was "Where they cure the bacon, ducks."—*Meat Marketing.*

● The real reason that British catering runs in a groove is because the public like it that way. Outside the world of "haute cuisine" the ordinary British customer is very suspicious of anything but the proverbial "cut off the joint."

● The other trouble is the fixed idea that it is un-British to complain about food. It is strange that, in a country where free speech is held in such esteem, most people meekly hesitate to speak up on this subject. As a result of all this reticence Britain, a political democracy, is a caterers' dictatorship. —*Letters in Daily Telegraph.*

● You take a seed potato from a dusty bag, put it in an earth trench well-mulched with manure, wait until nature has transformed it into a profitable clump, wait until most of the earth has dropped off and then pack the lot in fancy bags. After such a heavy exposure to contamination it seems a dreadful waste to wrap in pretty little bags, a produce which has to be peeled, washed and boiled in any case. —*Article in Municipal Journal.*

● Among questions which Mr. Nabarro had for the Chancellor of the Exchequer was one asking if he was aware that as a nutcracker was liable to purchase tax at 15%, whereas a door-knocker of over 5 in. was free of tax, there was an increasing practice of supplying nutcrackers with screw holes, so that they could theoretically be used as door knockers, with the result that such door knockers became free of tax. Mr. Nabarro asked why there was this invidious distinction between "door-knocking nutcrackers and nut-cracking door knockers."—*House of Commons Report.*

NEWS FOR IMPORTERS

Imports of Lemon Juice from U.S.A. — Arrangements have been made for the import of a further limited quantity of lemon juice from the U.S.A. This is to be purchased with dollars made available under the United States Agricultural Trade Development and Assistance Act, 1954 (Public Law 480).

Details of how to apply for licences, etc., are given in Notice to Importers No. 844, 1958, issued by the Import Licensing Branch of the Board of Trade.

Imports of North American canned fruits.—The Board of Trade announced that a further programme of imports of certain varieties of canned fruits from the United States, to be financed with funds made available under the Agricultural Trade Development and Assistance Act (United States Public Law No. 480), is under consideration. If this programme is agreed, a quota will also be established for imports from Canada.

In order to avoid delay in the issue of import licences, the Board of Trade are giving advance notification of the basis of allocation which they propose to adopt if the quotas are established, and are inviting importers to apply for licences in anticipation.

The projected licensing arrangements are on the same broad general lines as those for the previous quotas, but there is a modification designed to make it easier for importers of Commonwealth canned fruits to qualify. Details are given in Notice to Importers No. 847, issued by the Import Licensing Branch of the Board of Trade.

"Cellophane" in N.Z.

British Cellophane, Ltd., have formed a distributing company in New Zealand.

The new company—British Cellophane (N.Z.), Ltd.—will distribute "Cellophane" and B.C.L. polythene films as well as the various wrapping aids marketed by the parent company. It came into full operation on January 1, 1958.

Fire control film

A 16 mm. sound film entitled: "Fire Control in Industry" lasting 13 min., and commentated by Frank Phillips, has recently been made by the Colt Film Unit for Colt Ventilation, Ltd. It shows how a system of fire-venting can help to extinguish an accidental factory fire, why such a system is desirable as a precautionary measure and how it can also be used for day-to-day ventilation. Further details of this film, which is available on free loan, may be obtained from: the Film Librarian, Colt Ventilation, Ltd., Surbiton, Surrey.

Erections and Extensions

Associated British Maltsters, Ltd., are having laboratory and office premises erected at Mark Lane, Wakefield, Yorks.

▪

Auto Wrappers (Norwich), Ltd., Edward Street, Norwich, are planning to build a factory on a site at Rose Yard, Norwich.

▪

Brand and Co., Ltd., food manufacturers, are planning to erect extensions to their factory in South Lambeth Road, London, S.W.8, at an estimated cost of £90,000.

▪

Stokes and Dalton, Ltd., spice millers, Smithfield House, Charterhouse Street, London, E.C.1, plan to build showrooms and offices in Charterhouse Street.

▪

J. Robertson and Sons, Ltd., preserves manufacturers, have had plans approved for the erection of a fruit freezing and storage factory at Stevenson Street, Paisley, Scotland, at an estimated cost of £45,000.

▪

Pratt and Montgomery, Ltd., tea merchants, 50, Victoria Street, Belfast, N. Ireland, have purchased a site at the junction of Waring Street and Victoria Street, Belfast, for the erection of a tea blending and packing factory.

▪

A new depot has been opened in Torquay by the **Exeter and District Meat Trading Association.** It consists of a large hall with frozen meat and chiller rooms at either end. The capacity of the frozen meat room is 3,500 cu. ft. and it is cooled to 15-20°F. The chiller room is 5,800 cu. ft., and is cooled to 28-30°F. The Prestcold refrigeration equipment, which is fully automatic, incorporates hot gas defrosting.

▪

An ice-cream supply depot has been opened by **T. Wall and Sons (Ice Cream), Ltd.,** in Langford Road, Weston-Super-Mare. It provides cold-storage facilities for half-a-million pieces of wrapped ice cream. The cold store has a capacity of 2,500 sq. ft. One of the principle features of the new building is the use of concrete frames for the roof span.

The firm has also opened a new 10,500 sq. ft. depot with cold-storage facilities for 20,000 gal. of ice cream in Montagu Road, North Edmonton, London.

The latest version of the Commer Cob light van has a new o.h.v. power unit stated to have a better all-round performance than its side-valve predecessor. An extended wheelbase gives a larger capacity, the body is wider, and loading has been made easier by the interior height and rear door width having been increased and the loading height reduced.

Company acquisitions

Cow and Gate, Ltd., has agreed to purchase the whole of the share capital of Bristol Pure Milk Co., Ltd. The business of that company will, in future, be conducted in close co-operation with Bristol Dairies, Ltd., the Cow and Gate subsidiary in Bristol.

The Pulsometer Engineering Co., Ltd., have acquired the controlling interest in G. S. Tett and Co., Ltd., water softener consultants and manufacturers, of Bedfont Lane, Feltham, Middlesex. Mr. F. B. Duncan, chairman, and Mr. J. S. Woodrow, managing director of Pulsometer have joined the board of G. S. Tett and Co., Ltd.

James Hodgkinson (Salford), Ltd., have acquired a controlling interest in Bennis Combustion, Ltd., and their subsidiaries, the Saxon Engineering Co., Ltd., and Bennis Mechanisations, Ltd. Three Hodgkinson directors, Mr. N. C. Crighton, Mr. E. L. Hollinshead and Mr. J. S. Hodge, have been appointed to the board of Bennis Combustion, Ltd. The companies will trade under their own names.

Alfa-Laval sales and service

The sale of cream separators and milk clarifiers made by Alfa Laval Co., in Great Britain, is being handled jointly by: Alfa-Laval Co., Ltd., Great West Road, Brentford, Middlesex, and Cwmbran, Monmouthshire, and Graham-Enock Manufacturing Co., Ltd., London, N. 16.

Users can obtain spare parts and technical service by application to the above.

Technical Press Review

March

World Crops.—Cereals and Grain Handling; Rice Destruction by Crabs; Grain Drying; Cereal Production in Britain; Maize in the U.S.A.; Choice of Seed.

Dairy Engineering.—Mechanisation in Cheese-Making Processes: Current Development in Mechanised Cheese Manufacture; New Australian Method of Cheddaring Cheese; Czechoslovakian Developments in Cheese Manufacture; New Cleaning Technique for Centrifugal Plant; Detergent Recovery Methods—2.

Manufacturing Chemist.—Treatment of Glue and Gelatine with Formaldehyde; Veterinary Antibiotic Preparations; Nonionic Surface Agents—1; Progress Reports: Fertilisers and Plant Nutrients; Therapeutics; Antibiotics.

Automation Progress.—Transfer Line for Differential Carriers; New Concept of In-Line Transfer; Numerical Control in Action; New Semi-Conductor Amplifier; Reading Machines; Data Processing Case Studies; Automatic Loading of Multi-Spindle Automatics; Programme-Controlled Signalling on London's Underground Railways.

Chemical and Process Engineering.—Petroleum Chemical Activities in Great Britain; Annual Review of Metallurgy; Canada's Big New Aluminium Plant; Art of Chemical Plant Management—2; Chemical Engineering in the Atomic Energy Industry.

Atomics.—Britain is Nearest to Hydrogen Power; Thermonuclear Power Problems; Controlled Fusion Survey; Nuclear Fusion in Germany; Pluto in Action; Japan's First Reactor; Around the Sites.

Petroleum.—Petroleum Development in South Africa; Oil Geology of South America; Two Problems in Seismology; An Immersion Viscometer; Secondary Production Methods; Developments in Turkey; The Palembang (Sumatra) Refinery.

Paint Manufacture.—Oil and Colour Chemists' Association; Preview of the London Section Exhibition; Specific Surface and Pigment Volume as Factors in Dispersion; Mica in Emulsion Paints.

Corrosion Technology.—Vapour Phase Corrosion Inhibitors; Corrosion of Some Metals and Alloys in Uranium Hexafluoride; Application of Plastic Tape to Natural Gas Pipeline.

For specimen copies write to Stratford House, Eden Street, London, N.W.1.

Food News Overseas

Dutch instrument factory

An instrument factory has been opened in Zeist, Holland, by Negretti and Zambra, Ltd. The firm state that this factory is a part of the programme being brought into being to strengthen the position of the company overseas and offer their customers on-the-spot service facilities.

Eire fruit pulp exports

Following an investigation of the market possibilities for fruit pulp in Britain by an Eire group, large scale exports of the product are being arranged by Irish manufacturers to jam firms in London, York and the West Midlands. The main demand is for strawberries and black currants with raspberries also required in quantity. Last year over 600 acres of soft fruits were grown in Co. Wexford. An additional 350 acres is planned this year.

Bacon curing aid

The U.S. Meat Inspection Division has approved the use of sodium cyclamate, in the curing of bacon. It stipulates that slab and sliced bacon cured in this way must be marked: "sodium cyclamate, an artificial sweetener added."

It is claimed that its use in conjunction with salt and sodium nitrate imparts cooking qualities to the bacon superior to those resulting from the use of carbohydrate sweeteners. Du Pont make it.

Canned asparagus

Ireland is to make a speciality of canned asparagus for the export market. The vegetable is to be grown on a commercial scale in Kerry and suitable other south-west coast areas of Eire. The Kerry valleys have an ideal climate and the soil is loose and medium to light as asparagus requires. Besides canning the product Irish growers will also aim at getting into the London markets in April when asparagus first comes into season. Demand for the vegetable is very limited in Ireland. According to supply and quality the vegetable has sold within a price range of 7s. 6d. to 15s. a lb. in Eire.

★ An article on asparagus canning in California, giving full details of cultivation, processing and packing, appeared in FOOD MANUFACTURE, February 1958.

New food factory

The Delta Manufacturing Corporation of Makati, Rizal, Philippines, has been organised with a capital of $2·5 million to manufacture, process, package, can and preserve a variety of food products.

India's largest dairy

Aarey Milk Colony Dairy, the largest dairy in India, recently announced that during its seven years of operation it had pasteurised over 72 million gal. of milk. The greatest amount handled on any one day was 40,000 gal.

The processing room is equipped with two A.P.V. type *IIM Paraflow* pasteurisers, each of 2,000 gal. per hr. capacity. The weigh-bowls, receiving tanks, insulated milk storage tanks, stainless steel milk pumps and sanitary pipe fittings were manufactured by APV Engineering Co., Ltd., and their Calcutta associates. UDEC bottle washing and filling equipment is used, while refrigeration is by York Shipley, Ltd.

An Invitation to Authors

The publishers of FOOD MANUFACTURE invite the submission of manuscripts of books to be considered for publication. All manuscripts will be promptly acknowledged and carefully considered by qualified experts. A synopsis with chapter headings should be sent in the first instance to:

The Manager,
Leonard Hill (Books) Ltd.,
Leonard Hill House,
Eden Street,
London, N.W.1.

Leonard Hill are specialists in industrial, technical and scientific books. They have a reputation for vigorous and successful promotion of their books by extensive advertising and maintain a world-wide selling and distributing organisation.

£25,000 Rhodesian factory

A £25,000 food factory is to be erected in Gwelo, Southern Rhodesia, says Barclays Bank D.C.O. Products are to include native beer powder, breakfast cereals, macaroni, spaghetti and foods manufactured from rice.

International Biscuit Congress

The programme for the International Biscuit Congress, which is being held during the 4th International Sugar Exhibition in Amsterdam, April 22-30, 1958, is as follows: Rational Distribution and Pre-Packed Biscuits and Cookies; Packing of Biscuits; Tin-Plate as a Packing Material for Biscuits; Rationalisation and Mechanisation; and Development of Packing Machinery.

South Africa's record sugar crop

In spite of several setbacks caused by heavy rains and floods, the South African sugar industry is expecting a record crop this season. This is reported in its "Overseas Review" by Barclay's Bank D.C.O.

The latest estimate of production is 949,100 tons of sugar, which is 10,120 tons more than the record established in 1955-56. The total output of sugar for the season up to the end of November was 791,368 tons, made from 7,038,497 tons of cane. This was an increase of 35,040 tons compared with the same period for the previous year. During 1957, 114,000 long tons of raw sugar were exported to the United Kingdom.

Meat consumption in U.S.A.

The average American consumer ate about 159 lb. of meat in 1957—his share of the more than 27 billion lb. that were produced, according to the American Meat Institute. Total production was only slightly lower than the record 28 billion lb. produced in 1956, but, with the rapidly increasing population, per capita consumption dropped by about 8 lb. Meat production in 1958 will be about the same as in 1957, it is thought.

Slightly more than half of the 1957 production was beef, about 30% was pork, and the balance was veal and lamb. A small decline in beef production in 1958 is expected to be offset by an increase in pork production.

Profits on 1957 business in the meat industry were generally unsatisfactory, and much lower than the preceding year. Widely fluctuating supplies of livestock and high costs were partly responsible.

Packaging

Aluminium alloy crown seal

A new crown seal for bottles, known as the *Fords Crown*, has been introduced by Fords (Finsbury), Ltd.

The sealing principle reverses that of the normal cork-lined crowning cap by using the internal pressure, which normally has to be overcome, to help effect the seal. The crown shell is made of aluminium alloy and has a flowed-in gasket of sealing material on the knee of the corrugated flange, holding the crown against the lip instead of over the top. The method is stated to give a holding power double that of the steel crown of similar gauge. A dual-purpose lacquer is employed to fix the sealing compound and to protect the food.

Among the advantages claimed for the crown are that it does not rust and requires a pressure of only 50 p.s.i. for sealing, as compared with 600 p.s.i. for a normal seal. Being man-made, the sealing compound is stated to be consistent in quality, dust-free, inert and non-toxic.

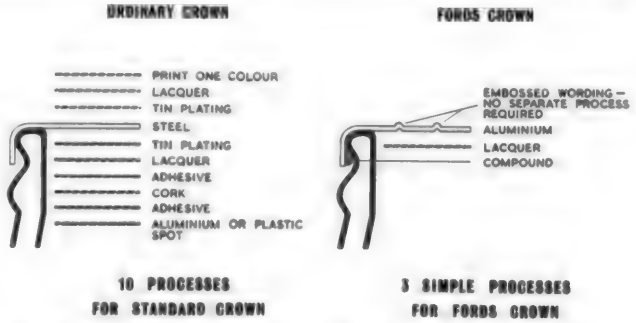
The crown gasket, it is pointed out, is produced under strict control and its properties can be predetermined. It is said to be unaffected by extremes of climate. The sealing compound is set in the shells at a temperature well beyond sterilisation limits.

The aluminium used in the crown is supplied already coated with food protective lacquer.

The crown may be tailored to the customer's requirements, and it can be made by the user himself from lacquered and embossed or printed strip material.

Fords (Finsbury), Ltd., emphasise that they do not manufacture the actual crown as an end product but only the machinery of production; a comprehensive range of machinery is available.

The aluminium strip, lacquered and printed, is supplied by the British Aluminium Co., Ltd., and the sealing compound by Dewey and Almy, Ltd.



The new Ford Crown, made from aluminium alloy, eliminates some of the processes for standard crowns.

Containers for dog food

A new carton has been introduced by Stamina Foods, Ltd., for their *Full-O-Meat* dog biscuits. The carton, which is made from British white lined chip board, has been produced by the Metal Box Co., Ltd.

The bottom and top of the carton are printed in red, and a red band goes round the upper and lower sides. All the wording is in white reverse lettering on this red background, except the firm's name and instructions for opening, which are in black.

In the centre of the white panels remaining on each side of the carton, there is a cut-out half tone of a dog's head. Each side shows a different breed and there are four different cartons in the series, showing sixteen different dogs in all.

The carton is lithographed, and both the dog's heads and the red ends and borders are finished with a litho gloss, which makes them stand out well.

The new can for Stamina dog food is also lithographed with a similar design. The decoration includes two dogs' heads—a spaniel and an alsatian. This can is also made and printed by Metal Box.

STAMINA
STAMINA
STAMINA

Trade Marks

RINTY.—766,609 and **RIN-TIN-TIN.**—766,610. Confectionery cigarettes. **Paramount Laboratories, Ltd.,** 174, Bradford Road, Trading Estate, Slough, Bucks.

MIXAROON.—766,750. Mixtures for making macaroon biscuits. **Chas. Southwell and Co.,** 39, Staffordshire Street, Peckham, London, S.E.15.

SPIN.—767,078. Biscuits (other than biscuits for animals). **Meredith and Drew, Ltd.,** 339-377, The Highway, London, E.1.

LION OF BABYLON.—762,090. Fresh fruits and foodstuffs for animals. **The Iraq Date Trading Co., Ltd.,** Dates Association Building No. 1, Ashar, Basrah, Iraq.

MALTAMOL.—766,844. Foodstuffs containing malt, for animals. **Chester Farmers, Ltd.,** Cow Lane Bridge, Chester.

KITTY KOLA.—765,709. Non-alcoholic drinks and preparations for making such drinks, all containing cola. **Kitty Kola Co., Ltd.,** 3, London Wall Buildings, London, E.C.2.

LIFE SAVERS.—744,838. Non-medicated sugar confectionery. **Life Savers Corporation,** Port Chester, New York, U.S.A.

ALLOVIT.—759,974. Wholemeal and wheatmeal flour. **Co-operative Wholesale Society, Ltd.,** 1, Balloon Street, Manchester.

HULA.—B765,903. Chocolates and non-medicated confectionery. **W. and M. Duncan, Ltd.,** 27, Beaverhall Road, Edinburgh, 7.

LITTLE CORPORAL.—766,608 Confectionery cigarettes. **Paramount Laboratories, Ltd.,** 174, Bradford Road, Trading Estate, Slough, Bucks.

BROOKMAID.—B763,983. Fresh fruits and fresh vegetables, and foodstuffs for animals and birds. **J. E. Cohen and Co., Ltd.,** Tesco House, Angel Road, Edmonton, London, N.18.

CASITA.—765,468. Non-alcoholic drinks and preparations for making same. **Morrison and Townend, Ltd.,** Morrison Street, Castleford, Yorks.

SKIP.—766,305. Non-alcoholic drinks and preparations for making same. **O. R. Groves, Ltd.,** 32, Shaftesbury Avenue, London, W.1.

HARGREAVES.—749,620. Canned pineapple. **J. Hargreaves and Sons, Pty., Ltd.,** 583, Brisbane Road, Manley, nr. Brisbane, Queensland, Australia.

KABAZI.—752,174. Canned vegetables and canned tomato purée. **Kabazi Estates, Ltd.,** Nairobi, Kenya Colony.

DAVEIN.—762,400. Meat extracts, fish extracts, and vegetable extracts, all for use for food or as ingredients in food. **David Anderson and Sons, Ltd.,** 20, Queen Street, Durban, South Africa.

HILLCREST.—758,441. Pears, peaches and apricots, all being canned goods. **Fruitvale Canning Co.,** 905, 66th Avenue, Oakland, California, U.S.A.

LARONA.—762,794. All goods included in Class 29. **C. J. Van Houten and Zoon N.V.,** 14, Prinsbernhardlaan, Weesp, Holland.

BIKSNIPS.—765,495. All goods included in Class 29. **O. Kavli Aktieselskap,** 59, Damsgaardsveien, Bergen, Norway.

OAKWELL.—765,512. Cooked meats and sausages. **E. V. Davies, Ltd.,** 11-15, Back Canning Street, Liverpool, 8.

SPORT.—765,958. Sardines (not live). **Levissac and Co., Ltd.,** 11-12, Fenchurch Street, London, E.C.3.

SUNBERGER.—766,796. Non-alcoholic beverages. **George Prentis and Son, Ltd.,** 37, Earl Street, Maidstone, Kent.

FRESHGROVE.—766,889. Fruit squashes. **Cochran and Co., Ltd.,** 1, Millar Street, Belfast, Northern Ireland.

PEARDRELLA.—766,941. Non-alcoholic drinks made from pears. **Whiteways Cider Co., Ltd.,** The Orchards, Whimple, Devon.

FOSTER CLARK'S GARDEN OF ENGLAND.—761,105. Canned fruits and canned vegetables. **Foster Clark, Ltd.,** Eiffel Tower Works, Hart Street, Maidenhead, Kent.

MAMADE.—762,348. Fruits, being canned, bottled, dried or preserved; and marmalade, jam, lemon-curd and mincemeat. **Spring and Co., Ltd.,** Riverside, Brigg, Lincs.

GLENLOCH.—762,092. Bread, biscuits (other than for animals), shortbread, cakes, pastry, and non-medicated confectionery. **Price Bros. (Bakers), Ltd.,** Parrott Street, Clayton, Manchester, 11.

BELLS OF ST. CLEMENTS.—762,221. Non-medicated sugar confectionery. **Oscar Moenich and Co., Ltd.,** 51, Crutched Friars, London, E.C.3.

VAN HOUTEN.—B762,793. All goods in Class 30. **C. J. Van Houten and Zoon N.V.,** 14, Prinsbernardlaan, Weesp, Holland.

GOLD MINE.—762,764. All goods in Class 30, except flour or yeast goods. **Matlow Bros., Ltd.,** Brunswick Works, New Mills, nr. Stockport, Ches.

ENGEVITA.—763,162. Yeast (for food). **Koninklijke Nederlandsche Gist- and Spiritusfabriek N.V.,** Wateringseweg 1, Delft, Holland.

MAYFLOWER.—763,675. Doughnuts and doughnut mixtures. **DCA Industries, Ltd.,** Doughnut House, Westmoreland Road, Queensbury, London, N.W.9.

BIKSNIPS.—765,496. All goods included in Class 30. **O. Kavli Aktieselskap,** 59, Damsgaardsveien, Bergen, Norway.

FEDERATION.—759,967. Salt for food. **Co-operative Wholesale Society, Ltd.,** 1, Balloon Street, Manchester.

SUNCRUST.—762,381. All goods included in Class 30. **Falkirk and District Co-operative Society, Ltd.,** 200, Graham's Road, Falkirk, Scotland.

BIRDS EYE.—762,478. Pies preserved by a quick freezing process. **Birds Eye Foods, Ltd.,** Unilever House, Blackfriars, London, E.C.4.

RANDERS "THREE TOWERS."—745,549. Meat, meat products (for food), bacon and sausages. **Factory Holding Co., A/S.,** Randers, Denmark.

JAKA.—765,775. All goods. **Judske Andelsslagteriers Konservesfabrik, A.M.B.A.,** Braband, Jutland, Denmark.

SANFAYNA.—766,352. Mixtures of tomatoes, sweet peppers and aubergines, all being canned goods. **Llacer Hermanos Sociedad Regular Colectiva,** Calle Progreso 66, Algemesi, Valencia, Spain.

SATIN.—766,365. Sugar. **Liverpool Sugar Mills, Ltd.,** trading also as the **Satin Sugar Co.,** Sugar Mills, Weaste Road, South Weaste, Salford, 5.

MURRAY.—766,681. Non-medicated sugar confectionery and chocolates. **Beecham Foods, Ltd.,** trading also as **R. S. Murray and Co.,** Beecham House, Great West Road, Brentford, Middlesex.

FANDANGO.—767,303. All goods in Class 30. **J. Lyons and Co., Ltd.,** Cadby Hall, London, W.14.

New Companies

Bransbys, Ltd. (593873.) Estcourt Road, Gt. Yarmouth. Provision and sausage and cooked meat mnfrs. and bacon curers. £20,000. Dirs.: D. Smith and T. H. Ratcliff.

C.R.S. Confectionery, Ltd. (593720.) 42a, Wilton Way, London, E.8. £2,500. Dirs.: B. H. Krise and C. R. Seaward.

Dairypak (England), Ltd. (594174.) Mnfrs. of and dealers in packages and containers, producers, mnfrs., packers, importers of and dealers in milk, butter, etc. £100. Subs.: D. N. Aylett, 18, Austen Friars, London, E.C.2, and J. B. A. Willis. Dirs.: H. W. Brock and S. Baker.

Globe Refining Co., Ltd. (594602.) 77, Milk Street, Bristol. To carry on the bus. of mnfrs. of and dealers in grocers' and confectioners' requisites, etc. £100. Dirs.: W. E. C. Kethro, W. R. and W. H. Kinnersley, and J. P. Birch.

Lockwoods Foods, Ltd. (593582.) Princes House, 190-195, Piccadilly, London, W.1. Mnfrs., preservers, packers and tinners and mchts. of consumable articles. £100. Permt. dir.: P. B. Lockwood.

Mujavi, Ltd. (592381.) 75, Wandle Road, Morden. Biscuit mnfrs., bakers, etc. £375. Dirs.: H. V. M. Muscat, Jean M. Viscoco and P. L. Gambin.

Nitrovit, Ltd. (594139.) 6-8, Sackville Street, London, W.1. Mnfrs. of and dealers in animal feeding stuffs, poultry foods, grain, seeds, etc.

Norwich Confectionery Co., Ltd. (593585.) 1, West Pottergate, Norwich. Mnfg. confectioners. £7,000. Permt. dirs.: B. S. Blyth, C. Womersley, K. E. P. Goff, W. G. Hammond and W. H. Wheeler.

Overseas Supermilk Co., Ltd. (593586.) 53, Eastcheap, London, E.C.3. Mnfrs. and dealers in food products of all kinds, including milk, cream, butter, cheese, chocolate, etc. £100. Subs.: Moira Snell and Diane Glover.

Royd Ices (Mytholmroyd), Ltd. (594658.) Stocks Estate, Mytholmroyd, nr. Halifax. Ice cream mnfrs. £2,000. Dirs.: Charles A. and Mrs. A. Mitchell and Cedric A. Mitchell.

Servauto, Ltd. (592450.) 13, Moss Lane, Ashton-on-Mersey, Sale, Ches. Mnfrs. of and dealers in automatic machines for supplying foods, etc. £100. Dirs.: Mrs. V. Choularton and Mrs. B. Weston.

Shalet-Glaco, Ltd. (594485.) Ice cream, sweet mnfrs., etc. £100. Subs.: R. P. R. Swallow, 21, Plantation Road, Slade Green, Kent, and G. W. R. Rees.

S. W. Soper and Sons, Ltd. (594486.) 14, Queen Street, London, E.C.4. Mnfrs., importers and dealers in foodstuffs, etc. £10,000. Permt. dirs.: S. W. Soper and D. G. Soper.

Tuckwell and Co., Ltd. (593749.) 4, St. Georges Parade, Perry Hill, London, S.E.6. Mnfrs. of sugar, chocolate and other confectionery, etc. £3,000. Dirs.: W. J. Tuckwell and I. E. Hubbard.

Wiggans (Confectioners), Ltd. (594292.) £1,000. Gov. dir.: M. Endbinder, 3, Yewlands Avenue, Fulwood, Preston.

These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

788,724. H. JENNY: Method for the preservation and durable vitaminisation of roasted and ground coffee.
788,757. GEB. BUHLER: Machines for liquefying chocolate and cocoa masses.
788,961. T. L. SEABORNE: Vacuum-operated master pulsators for milking machines.
789,000. RESEARCH INTERESTS, LTD., and G. WEISHEIT: Resistor themometers.
789,091. GENERAL FOOD CORPORATION: Angel food cake production.
789,123. J. LYONS AND CO., LTD.: Instruments for measuring or indicating moisture content of materials.
789,186. H. SIMON, LTD.: Machines for delivering meal and similar materials in measured quantities.
789,193. METAL BOX CO., LTD.: Bag-closing machines.
789,301. L. CALCAGNO: Purifying proteins.
789,368. G. GERVAIS: Discardable package for foodstuffs.
789,492. MODERN COFFEES, INC.: Infusible coffee bag.
789,615. AKTIESELSKAPET PROTAN and O. HELGERUD: Preservation of food.
790,579. H. AND K. STAEHELY: Milling machines.

ABSTRACTS

Fat spray for bakery dough

In an apparatus for applying edible fat to bakery dough as the dough passes on a conveyor before it is baked, the liquid fat is intermittently delivered to the spraying nozzles by a high-pressure multi-cylinder pump. The spraying nozzles are directed towards the dough-pieces, each nozzle being connected to a different cylinder of the pump. The speed of operation of the pump is adjustable to that of the conveyor. The result is that each piece of dough is subjected to a number of collective discharges whilst passing the spraying nozzles.

The pump and the spraying nozzles may be adjusted to ensure that each dough-piece receives only enough fat to prevent the dough from sticking to the baking tin. A scraper may also be included to regulate the amount of fat picked up from the underside of the conveyor by the dough pieces.

The surplus oil draining from the conveyor may be collected in a tray, from whence it flows through a strainer or strainers to a heated storage tank connected to the pump.—784,948. *Albert Croft and Gordon Hallett.*

Improving ingredient for baked products

A flour-water suspension, prepared from non-chemically pre-treated flour and sufficient water to completely swell the albumen micelle colloids contained therein, is processed to form an improving ingredient.

The batter of flour and water in the proportions between 1:1·06 and 1:2·1 is beaten in the presence of air or oxygen for between 4 and 30 min. with sufficient force and for sufficient time for the albumen micelle colloids, which are swollen by the absorption of water, to be broken down into smaller particles.

Substances may be added to the batter to promote the swelling and oxidation processes of the gluten-albumen complex and/or the carbon dioxide evolution which subsequently takes place in the dough containing yeast.

The beating of the batter takes place at above room temperature but at not more than 50°C.

The resultant product is converted into a powder before it is incorporated into a dough, the evaporation also taking place at a temperature not exceeding 50°C.—784,416. *C. and C. W. Brabender.*

Heat distribution in bakers' ovens

The object of this patent is to provide a good heat distribution throughout the length of the baking chamber of the oven.

Difficulties are stated to arise where it is necessary to bake goods consecutively, varying the temperature of the chamber in a short period of time. It is claimed that this difficulty is overcome in an oven which has at least two groups of ducts through which the products of combustion are conveyed from the combustion chamber to a flue. Each duct group has a damping device for regulating the flow to the flue, and the two groups provide respectively the floor and the para lel ceiling of the baking chamber of the oven. This baking chamber is heated by irradiation from this floor and ceiling and by a number of closed convector tubes extending into the ducts, the tubes being adjustable so that the length extending into the ducts can be varied.

The oven may have a pair of duct groups, the ducts being disposed side by side symmetrically at each side of a main duct. Two banks of closed convector tubes are associated with each group, one on either side, the tubes extending through the ducts at the respective side of the main duct of the group and terminating in the main duct.—783,364. *A. Marinoni.*

Carbonating apparatus for aerated water

Apparatus for carbonating water and like liquids has a cylindrical carbonating chamber around which are wrapped two pipes extending throughout the whole length of the chamber and leaving no part of the wrapped surface exposed. One of the pipes conveys the water or other liquid to the chamber while the other is traversed by the refrigerant. The coils of the refrigerant pipe are metallically bonded to the wall of the chamber and also to the contiguous coils of the pipe carrying the water along continuous helical lines of contact.

It is claimed that the refrigerating capacity can be reduced and working pressure kept down by this arrangement, which cools the carbonating chamber as well as pre-cooling the water.—785,713. *D. C. Parr.*

Malt product preparation

A malt product which may be used directly or with suitable mixings or coatings for human consumption is claimed. According to the invention, ungerminated barley or other cereal grain has the husks and other outer skins removed by the action of a solution of sulphuric acid at a concentration of 30% or above by volume and at atmospheric temperature. Afterwards the acid is washed off along with the husks. The treated grain is then rubbed or stirred to remove the last of the husks before a final water rinse or, alternatively, a chemical wash to make sure that the acid is neutralised. Suspensions of calcium carbonate or solutions of alkalies in water are suitable for this purpose.

The grain is then soaked in water and allowed to germinate at a suitable temperature. After a selected period of growth the grain is heated in order to remove the moisture and give it colour and flavour before being screened to remove the dried shoots and rootlets which have formed during germination.

The malt product obtained in this way may be used for human consumption or, alternatively, it may be ground alone or with malted or unmalted barley or other cereal or starch to provide a grist which may be extracted with hot water to provide a sweet beverage. This in turn may be boiled and fermented to provide a clear alcoholic beverage, largely free from the disadvantages associated with the formation of hazes.—786,973. *Brewing Patents, Ltd., and J. R. A. Pollock.*

Food preservation

A method of preserving food is claimed in which the food is enclosed in a bag or container after it has been cleaned or dressed. The bag, which must be made of flexible, waterproof and preferably transparent material, capable of withstanding cooking temperatures, is evacuated by removal of the gases and sealed, the package then being heated to a temperature not exceeding 100°C. The bag is held at that temperature long enough for the vegetative bacteria to be destroyed. After this it is cooled and stored at a temperature which will permit the development of any spores to vegetative bacteria, the said heating and storing steps being repeated until the food is effectively sterilised.

The quantity of the food placed in the container should not exceed 60% of its maximum volume. The cooling may be performed rapidly by spraying the package with cold water or using some such method.—785,795. *S. E. O. W. Erasmie and B. O. Schlyter.*

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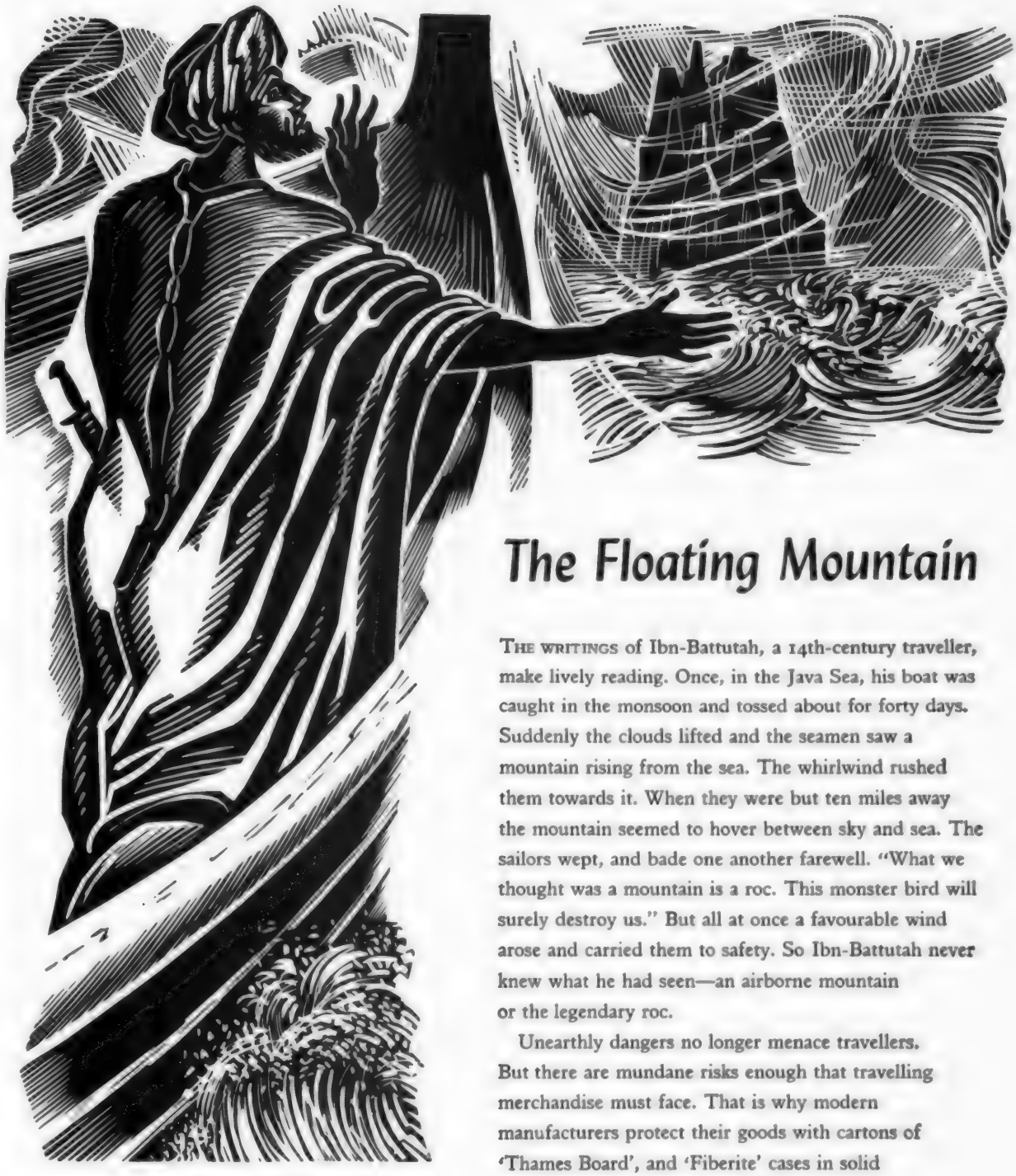

Wood engraving by John Farleigh

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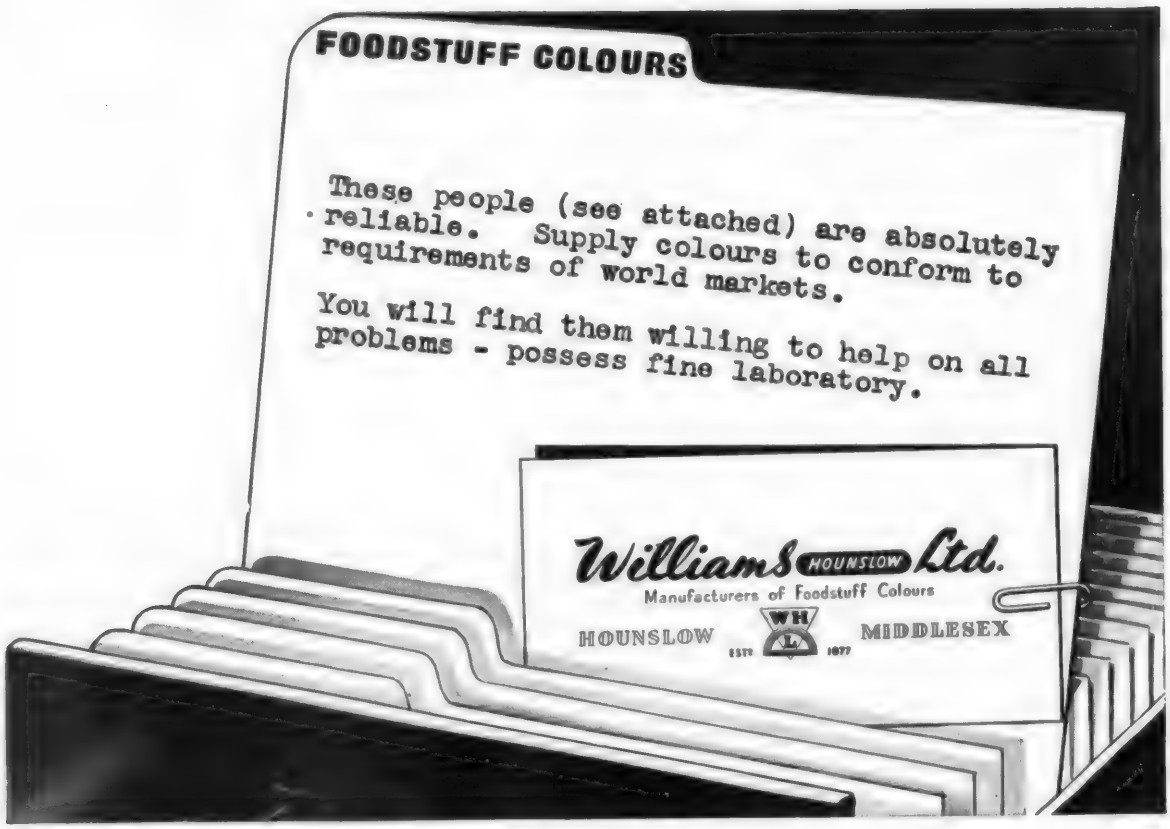

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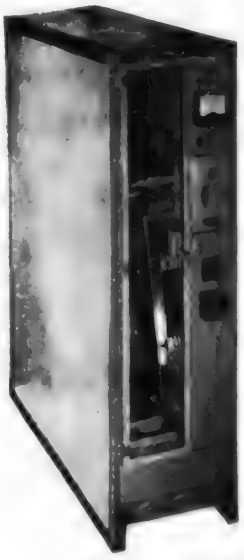

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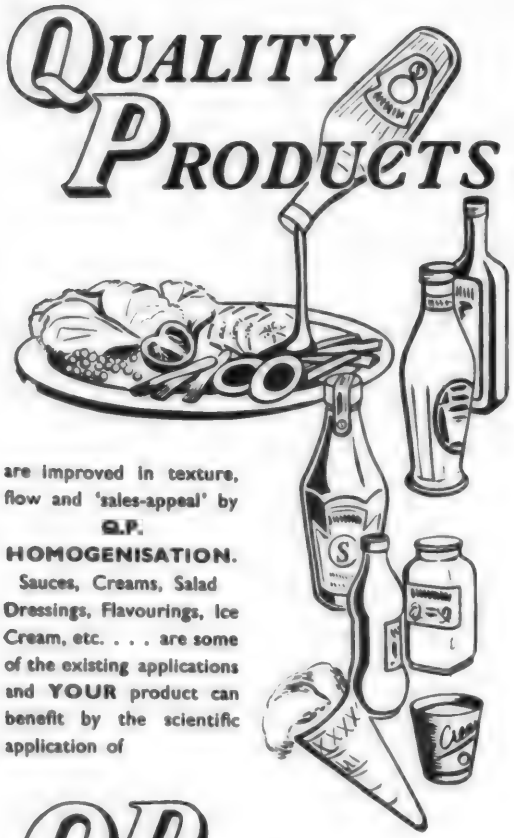

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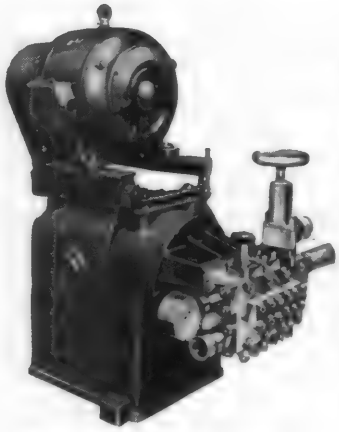

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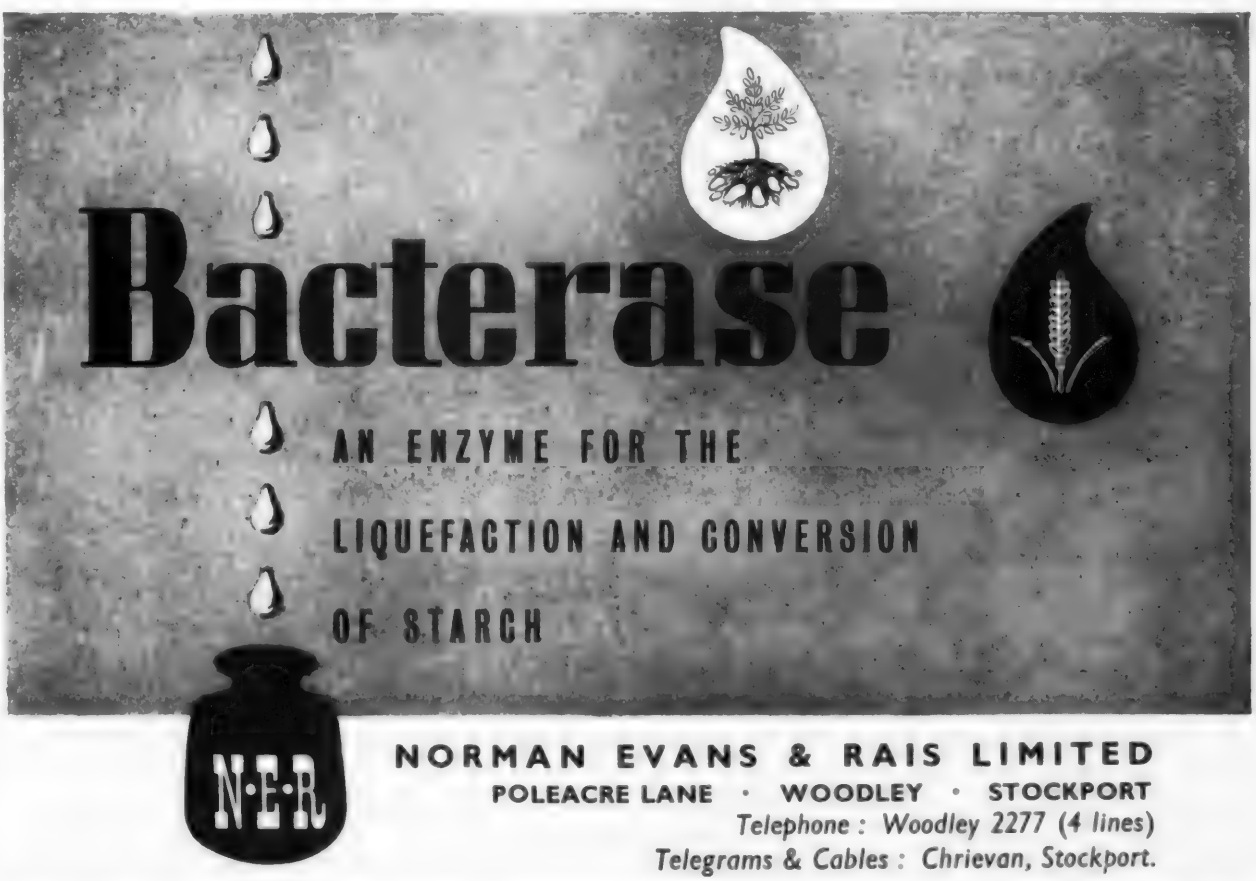

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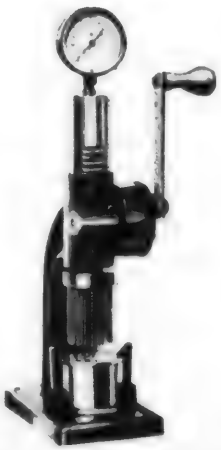

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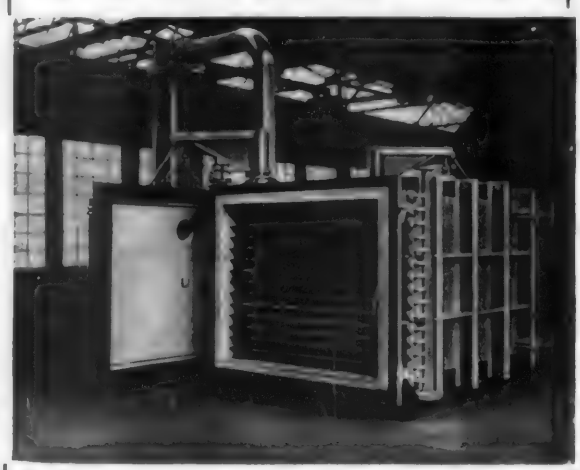

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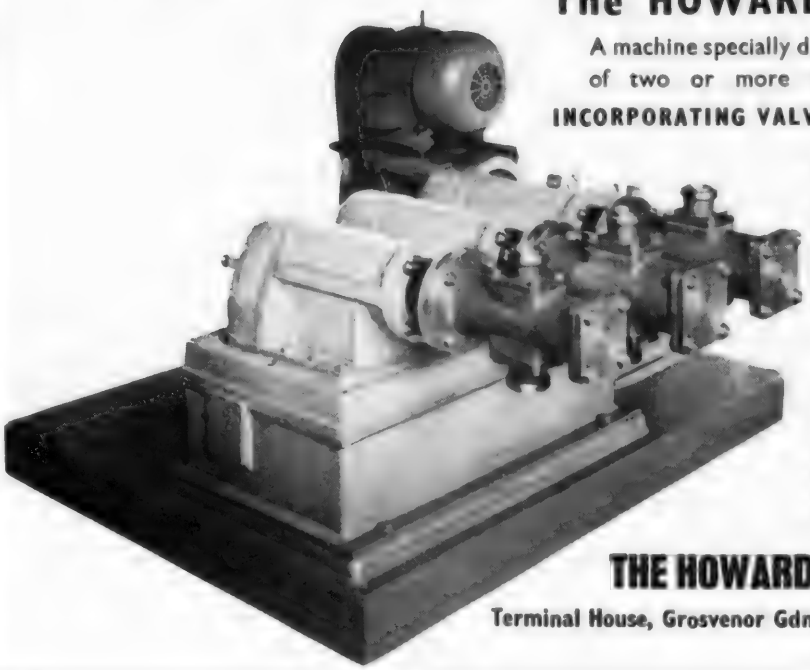

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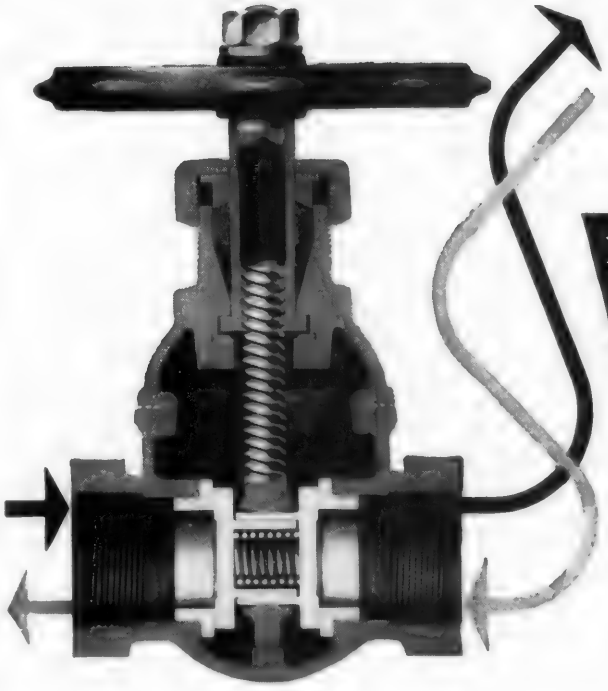

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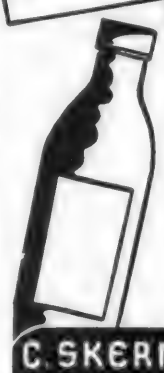

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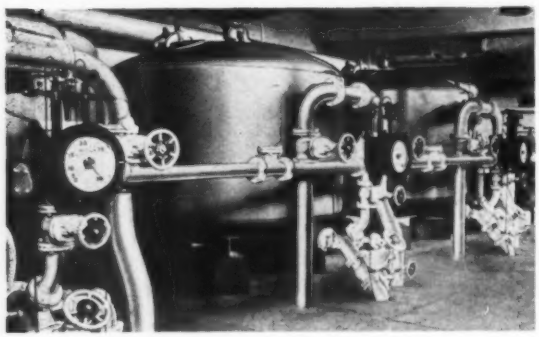

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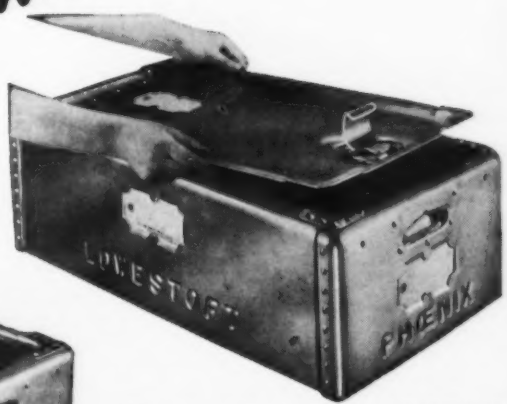

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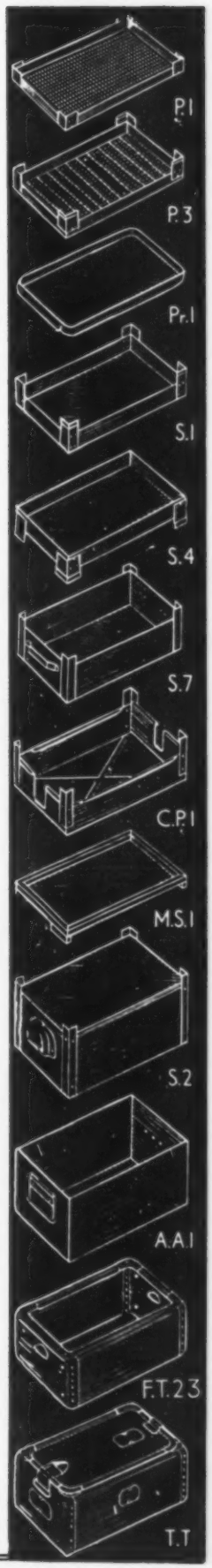

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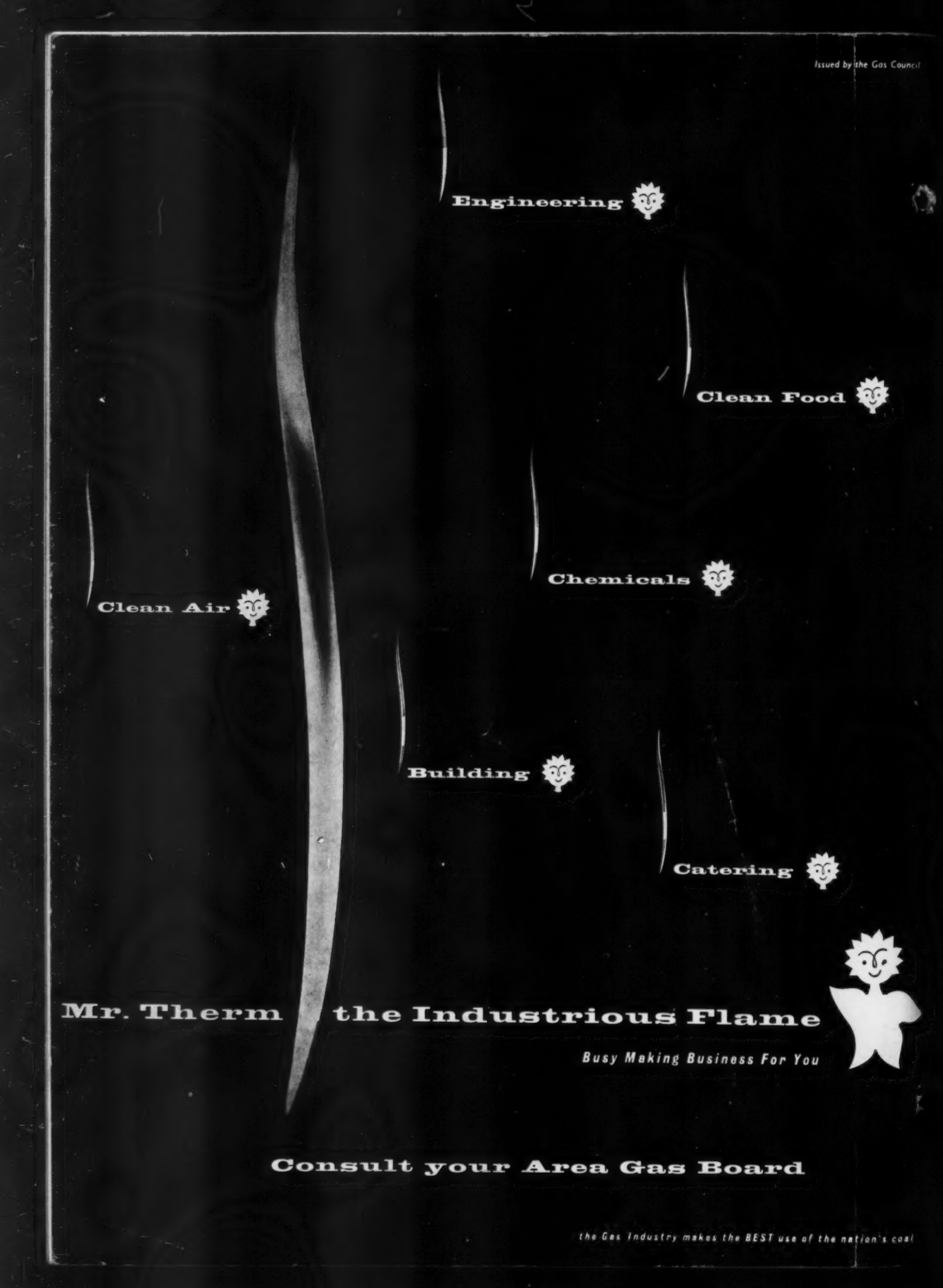

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